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ABSTRACT

The proceedings of the Association of American Medical Colleges (AAMC) conference on the declining applicant pool and implications for the selection of medical students is presented in six parts. Part 1, The Down Side of the Slope, includes four papers: "The Declining Applicant Pool: An Overview" (R. Petersdorf); "Applications: Disease or Symptom?" (R. Stevens); "Trends in the Characteristics and Academic Qualifications of Medical School Applicants" (C. Tudor); "Increasing Minority Enrollment in an Era of a Declining Applicant Pool" (R. Miller); and "Educating in an Era of a Declining Applicant Pool" (L. Kettel). Part 2, Using AAMC Data in Admissions, offers: "Data From AAMC Medical School Applicant and Matriculant Questionnaires" (C. Tudor); "Data From AAMC Operational Files" (R. Randlett); "Data from AAMC Student and Applicant Information Management System" (C. Killian); and "Data From AAMC Institutional Profile System, Faculty Roster, and Hospital Surveys" (P. Jolly). Part 3, Using Institutional Data in Admissions, features: "Factors Related to Black Student Success in Medical Schools" (L. Sachs and L. Morris); and "Comprehensive Student Database as a Resource to the Admissions Committee" (G. Nowacek). Part 4 discusses Improving the Admissions Process: "Increasing the Effectiveness of the Selection Interview" (J. Molidor); "Using MCAT Data in Admissions" (K. Mitchell); "Selecting Nontraditional Applicants Using the Simulated Minority Admissions Exercise" (W. Sedlacek and D. Prieto); "Assessing the Admissions Process in an Era of a Declining Applicant Pool" (K. Mitchell); and "Combining Academic Qualifications to Assess Fill Rates and Graduation Rates" (W. Luke). Part 5 covers Marketing Medicine as a Profession: "Promoting Medicine and Medical Career" (K. Rabin); "Increasing Awareness of Ethical Considerations in Admitting Students" (B. Rankin); "Comparing Medical School Matriculants and Non-Matriculants" (D. Lindley); and "Marketing the Profession" (E. Martin). Part 6, Marketing Your Medical School, looks at: "Increasing Your Awareness of Student Needs" (J. Eudes); "Knowing Your Customer and Your Competition" (J. Beckham); "Developing Northwestern's Medical Student Recruitment Package" (E. Hoo); and "Magnifying Your Voice and Multiplying Your Messages" (J. Moore). Appended is a roster of participants in the conference. (SM)

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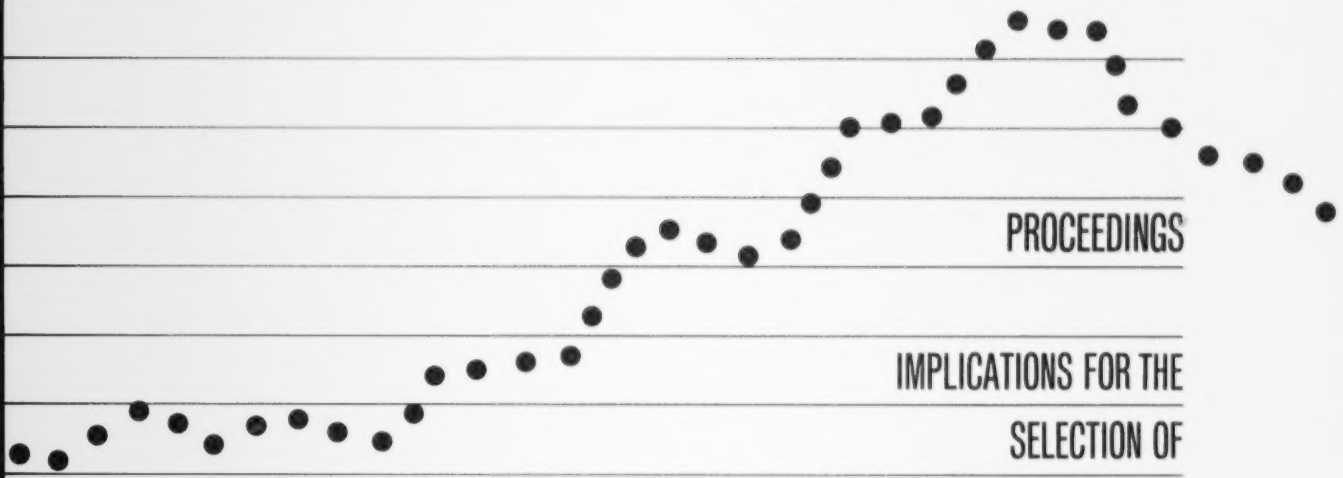
THE DECLINING APPLICANT POOL



PROCEEDINGS

IMPLICATIONS FOR THE SELECTION OF MEDICAL STUDENTS

AAMC INVITATIONAL CONFERENCE

JUNE 13-14, 1988

WASHINGTON HILTON HOTEL

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TABLE OF CONTENTS

PART 1 / THE DOWN SIDE OF THE SLOPE

The Declining Applicant Pool: An Overview 1
Robert G. Petersdorf, M.D.

Applications: Disease or Symptom? 5
Rosemary Stevens, Ph.D.

Trends in the Characteristics and Academic Qualifications of Medical School Applicants . . . 9
Cynthia G. Tudor, Ph.D.

Increasing Minority Enrollment in an Era of a Declining Applicant Pool 21
Russell L. Miller, M.D.

Educating in an Era of a Declining Applicant Pool 27
Louis J. Kettel, M.D.

PART 2 / USING AAMC DATA IN ADMISSIONS

Data from AAMC Medical School Applicant and Matriculant Questionnaires 33
Cynthia G. Tudor, Ph.D.

Data from AAMC Operational Files 35
Richard R. Randlett

Data from AAMC Student and Applicant Information Management System 37
Charles D. Killian

Data from AAMC Institutional Profile System, Faculty Roster, and Hospital Surveys 39
Paul Jolly, Ph.D.

PART 3 / USING INSTITUTIONAL DATA IN ADMISSIONS

Factors Related to Black Student Success in Medical Schools 43
Larry A. Sachs, Ph.D., and Leibert W. Morris

Comprehensive Student Database as a Resource to the Admissions Committee 49
George Nowacek, Ph.D.

PART 4 / IMPROVING THE ADMISSIONS PROCESS

Increasing the Effectiveness of the Selection Interview 55
by *John B. Molidor, Ph.D.*

Using MCAT Data in Admissions 61
by *Karen J. Mitchell, Ph.D.*

Selecting Nontraditional Applicants Using the Simulated Minority Admissions Exercise 63
by *William E. Sedlacek, Ph.D., and Dario O. Prieto*

Assessing the Admissions Process in an Era of a Declining Applicant Pool 65
by *Karen J. Mitchell, Ph.D.*

Combining Academic Qualifications to Assess Fill Rates and Graduation Rates 69
by *Wendy L. Luke*

PART 5 / MARKETING MEDICINE AS A PROFESSION

Promoting Medicine and Medical Careers 77
by *Kenneth H. Rabin, Ph.D.*

Increasing Awareness of Ethical Considerations in Admitting Students 79
by *Billy Rankin*

Comparing Medical School Matriculants and Non-Matriculants 81
by *Diane W. Lindley*

Marketing the Profession 87
by *Elizabeth M. Martin*

PART 6 / MARKETING YOUR MEDICAL SCHOOL

Increasing Your Awareness of Student Needs 91
by *John Eudes*

Knowing Your Customer and Your Competition 93
by *J. Daniel Beckham*

Developing Northwestern's Medical Student Recruitment Package 95
by *Ellen Soo Hoo*

Magnifying Your Voice and Multiplying Your Messages 99
by *Joan Hartman Moore*

APPENDIX

Roster of Participants in the Conference on the Declining Applicant Pool: Implications for the Selection of Medical Students, June 1988 105

PART 1

The Down Slide Of The Slope

The Declining Applicant Pool: An Overview 1
Robert G. Petersdorf, M.D.
Applications: Disease or Symptom? 5
Rosemary Stevens, Ph.D.
Trends in the Characteristics and Academic Qualifications of Medical School Applicants . . . 9
Cynthia G. Tudor, Ph.D.
Increasing Minority Enrollment in an Era of a Declining Applicant Pool 21
Russell L. Miller, M.D.
Educating in an Era of a Declining Applicant Pool 27
Louis J. Kettel, M.D.

The Declining Applicant Pool: An Overview

Robert G. Petersdorf, M.D.

The rationale for the AAMC Conference on the Declining Applicant Pool in June 1988 can be summarized simply. Since 1974, the peak year for applicants, the number of persons applying to medical schools in the United States has dropped by more than 14,000. Today one-third fewer people apply to medical school than did 14 years ago. This decline has occurred at a time when the number of 22-year-olds, the primary source of medical school applicants, has been increasing. Now this country is about to enter a decade in which the number of 22-year-olds will decline. What actions should our medical schools take in the face of these demographic imperatives?

Conference Concerns

Fundamental to the concern about the decrease in the number of applicants is the perception that the decrease in available applicants has been or surely will be accompanied by a change in the qualifications of the applicants. Specifically, with fewer applicants from which to choose, medical schools could be in a position of considering and accepting for matriculation individuals whose academic qualifications would not have been competitive several years ago.

These concerns and perceptions are exacerbated by the fact that many of you were not in the business of selecting medical students in the pre-1970 era when the applicant-to-position ratio was similar to what it is now. You have been more accustomed to rejecting students with competitive academic qualifications rather than worrying about whether your candidates can complete medical school successfully.

Dr. Petersdorf is President, Association of American Medical Colleges.

The major questions among admissions officers now seem to be

1. Is the decrease in the number of students aspiring to a career in medicine resulting in an applicant group less well qualified than those of the past?
2. Are the medical students we are now educating less well prepared to enter the profession than those of a decade ago?
3. What effect, if any, will demographic changes, as well as changes in academic qualifications of students, have on our teaching faculties and also on the eventual specialty selections that our graduates will make?
4. Why are fewer individuals choosing a career in medicine despite a continuing increase of interest in a medical career expressed by freshmen undergraduates?

All of these questions lead to the question of what the AAMC and its member medical schools can do proactively about the apparent decline in interest in a medical career. To this one might ask whether this concern is appropriate, given the perception by some that the nation has an abundance, if not a surplus, of physicians--a state that may continue through the first 25 years of the 21st Century.

But let me return to a central theme of this conference, namely why the apparent decline of interest in medical careers has been occurring. The AAMC Council of Deans and Executive Council has identified this issue as a high priority on the Association's agenda. Having reached agreement on this point, however, there is no consensus about how we are to address this issue.

How the desirability and attractiveness of a career in medicine can be publicized is a topic that the AAMC has considered for several years. The first discussion took place at the Annual Retreat of AAMC's new Officers in

1985. At that time, the participants tried to determine what was making the profession of medicine less attractive to the nation's youth than other careers. Those assembled at the retreat felt fortunate to be in the medical profession and could only conjecture as to what had caused this phenomenon. They wondered if this change could have resulted from the prediction in national circles of an impending doctor glut. Was it the cost of obtaining a medical education--the financial outlay and the years of sacrifice that precede independent practice? Was it the changing structure of the health care delivery system? Was it the professional liability crisis? Why, at a time when the medical profession could do more than ever to treat and cure disease, were its practitioners viewed in more and more unfavorable terms by the public they serve? An even more important question was what could be done to reverse this trend to introduce young people to the exciting opportunities that medicine can offer them.

Current Challenges

These serious and perhaps unanswerable questions probably mirror discussions that admissions officers and their colleagues have had in considering the applicant pool at their institutions. It is clear that there is still a need for physicians. The growth of the geriatric population, the AIDS epidemic, and, most importantly, the large and increasing number of individuals who lack access to adequate medical services, demonstrate a continuing need for medical professionals and offer proof that the provision of health care continues to pose formidable challenges to this country. It is also clear that we need to attract into medicine persons with particular characteristics and interests: more minority physicians, physicians who will serve in rural and other underserved areas, and physicians interested in primary care careers. If the potential medical school applicant is unaware of these special needs, then the profession has not done a good job of communicating these needs and inviting the participation of those who wish to address them.

I am concerned that physicians are thinking and speaking about their profession in negative terms. Examples abound of physicians who criticize the profession, who counsel people not to pursue a career in medicine, and who complain about practice conditions. Too often physicians who speak with frustration about the changing climate of medical practice are viewed unsympathetically by a public that views physicians' frustrations as being primarily monetarily motivated. While it may be true that some aspects of medicine may not be as much fun as they used to be, I find myself more in sympathy with the views of Thomas Lee, a cardiologist at Brigham & Women's Hospital, who was quoted in *Newsweek* last year as saying, "Nobody sensible would want to return to the medicine of even five years ago. Physicians especially must stop confusing concerns over their own incomes with medicine as a whole. Our incomes may go down a bit, but doctors will always be well off. We will always have a kind of satisfaction no money can buy. Anyone who feels otherwise has no business treating patients in the first place."

I strongly believe that medicine is an intellectually exciting, challenging, and rewarding career. We must be prepared to deliver this message.

AAMC Strategies

The Association's executive staff is developing a strategic plan that will be presented to AAMC's officers and governing body. One goal of that plan is, "To attract the most talented and broadly representative persons into medicine." To meet this goal the Association must be active in two arenas. In the short term, we must learn to function most effectively with the applicant pool we have. Secondly, we must develop long-term strategies to increase the applicant pool and the number of qualified persons interested in a medical career.

To meet the first objective, we need to help our member medical schools deal with the realities of the existing applicant pool. This conference is an important and visible

demonstration of such an activity. Another is the Association's Task Force on Physician Supply, which is attempting to provide environmental information to our members. As a part of the Task Force's activities, the Association has been developing a more sophisticated manpower model that can be used to make projections about future physician supply. This year the Association published the second edition of *Trends in Medical School Applicants and Matriculants*. This is an example of the more detailed analysis of the applicant pool that is a consequence of the AAMC's progressively sophisticated data bases. One of the things you will learn at this conference is how our comprehensive student and applicant information management system can be used for analyses of individual institutions.

A second facet of the Association's response to the decreased interest in medicine must be to reverse that trend. As I stated earlier, I believe medicine is exciting. I believe there are areas of real need in medicine, and I believe medicine can be challenging and rewarding. I am not alone in this belief. The question is how to communicate this belief to our target audience. Last year the AAMC, along with the American Medical Association and the American Hospital Association, sponsored a conference on the image of the physician. I used that opportunity, as I do every time I have a physician audience, to tell them to stop bad-mouthing medicine. I do hope that those who would denigrate our profession think hard about how much damage they are doing to its future.

In a major staff reorganization last year the Association upgraded its communications, media relations, and public education functions under the direction of a new vice president who serves on the AAMC executive staff. In the past the Association has limited its communications primarily to its members, and we have very little experience with trying to reach the general public. The AAMC Vice President for Communications has been charged with developing methods by which the Association can reach out to broader audiences, and we have identified as a primary target college students who are making career decisions. The Association plans to develop a videotape that can be used at undergraduate colleges both for recruiting activities by specific schools and for general information about medicine as a career. We realize, too, that the Association must begin to develop strategies for dealing with younger populations, such as high school students, and we intend to target groups currently underrepresented in medicine.

As we contemplate the declining applicant pool and its implications, we welcome your assistance as your Association undertakes a variety of activities to ensure that medicine continues to attract the most talented and broadly represented persons into medicine.

Applications: Disease or Symptom?

Rosemary Stevens, Ph.D.

Why should medical schools be concerned about the decline in applicants? There are, after all, 70 percent more applicants than places. And there are well-known screens in place that make many (if not most) of the applicants qualified to go to medical school. Admissions offices and committees might well breathe a sigh of relief that there is now less to do than a few years ago. In many ways the present level and quality of applications is not a problem itself--although the trend, if continued, may become a serious problem in the future.

Nonetheless there are two ways in which present concern about applications is of fundamental importance to the schools:

1. The declining number of applications is perceived as a problem. This perception is important because it opens up possibilities for making real changes in the schools and in medical education.

2. Perceptions about applications are symptoms of other problems--of the attractiveness of medical education to prospective students; of the image of the profession; and of ambivalence about the future of medicine.

To some extent, concern about the applicant pool is a displacement of anxiety about other major changes. But my message is upbeat and optimistic. I believe that the door is open for imaginative changes in medical education to an extent that has not been possible over many decades. Medicine, like other professions, has been much better at wringing its hands over problems than in formulating solutions--and, more importantly, implementing them. What is happening now is a healthy wrench away from a basic philosophy often attributed to the Flexner report (1), that is, of constantly raising the qualifications of applicants to medical school and of rating medical schools as successful according to the degree they can compete successfully for students. Medical schools have become accustomed to a high level of competitiveness within the applicant pool, as if the more applicants there were and the higher the quality, the greater the status of the school. It is time we questioned this long tradition of upward mobility.

Over and above this, as everybody here knows, there are major problems in having a large number of applicants relative to places. For how are applicants to be selected? It is instructive to see how the schools got themselves into the present position. For illustration, I will draw on two AAMC reports on medical education in the past 60 years. Both are relevant today.

The first is an influential report in 1932 (2), which reviewed the down-side of the Flexner reforms as they crystallized in the 1920s. The rising number of applicants in the 1920s, concluded this report, had already greatly complicated certain features of the selection of medical students. Medical schools were now showing a clear preference for students with full college education and they were often specifying premedical requirements, supposedly to set up mechanical or objective methods in selection. Note that the preference for college graduates is assumed to derive from medical school selection procedures--making selection easier--rather than from educational objectives themselves. So began the long history of designing objective criteria to make the task of admissions committees easier.

In a set of themes that have recurred again and again, the 1932 report warned schools not to exclude students with unusual backgrounds; reminded admissions committees that prescribing specific premedical educational

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Dr. Stevens is Professor, Department of History and Sociology of Science, University of Pennsylvania.

courses ignores the fact that the boundaries between the sciences are permeable and artificial (and now, of course, it is not at all clear what the appropriate sciences are); and threatened intellectual self-reliance and broad cultural interests. Selection should, in short, take into account "character, personality, industry, native ability, attentiveness devotion, thoroughness, judgment, constant study, and good health." That was fifty-six years ago.

These same messages have rung through debates year after year. Even if we only go back one generation or so--to my second illustration in 1953, when John E. Deitrick and Robert C. Berson did a major report on medical schools at mid-century--we find the same "problem of selective admissions": the premed syndrome; undergraduate grades and now the use of MCAT as screens to help admissions committees. Again there are the obligatory statements about character. This time they include responsibility, human understanding, social sensitivity, and "moral courage," as well as intellectual ability.

Yet at the same time there was enormous pride in the success of the schools since the Flexner report because they were so eagerly sought after by the cream of the academic crop. There was the strange assumption that medical education should be parallel to the PhD in terms of entry, (that is, a graduate program) while medical education itself continued to be seen as an undergraduate experience. Deitrick and Berson describe the medical school as an organization that is successful along multiple dimensions, including the search for research grant project funds. Medical centers, they reported in 1953, were already assuming the "shape of big business." They judged their success in large part by money, competitiveness, and size. The number of applicants was almost a by-product of this larger process. The more of them, the more prestigious was the school. In turn, at least some of today's concern about decreasing applications is a displaced concern about the status of the medical school--a reflection of institutional perceptions of its role, importance, and success.

But let us come back to the applicants themselves. There should be a particular alarm, of course, if the number of acceptable applicants has dropped significantly in the past decade. But here we come to the problem of defining "acceptable." Acceptable in the recent past has seemed to mean students who have been the most successful undergraduates, particularly in large competitive science classes. I find it fascinating that despite all the lip service paid to well-rounded students, who are sufficiently self-confident to avoid the premed grind and able to think for themselves, and so on, changes in average MCAT science scores are still regarded as major quantitative indicators of quality. Others will address up-to-date trends and scores, but it is curious that between 1978 and 1986, a period of great discussion over liberalizing selection, concentrating on a wide variety of skills and encouraging individualized learning in the schools, all of the MCAT science scores of matriculants went up, while reading and quantitative skills went down. Presumably the message from reports like GPEP is to establish life-long learning, which surely requires the highest possible reading and quantitative skill (3). Indeed it would be interesting to see whether students admitted to medical school on the basis of GREs instead of MCATs, for example, did better or worse than their peers.

The figures for GPAs were down a little between 1978-1986 but they were still very high (3.5). Why do AAMC reports put such stress on GPA as a variable? Looking through the figures, for example, one sees that about 1,300 white students and 600 black students with GPAs of less than 3.0 matriculated in medical schools in 1986. How are they doing? If they are doing just as well as those with higher GPAs, perhaps there is a further untapped pool of applicants who do not apply to medical school because they think their GPAs are too low.

It is my impression, though, that relatively little is known about GPAs in terms of actual performance. Do, for example, students with GPAs between 2.75 and 3.0 do much worse than those with higher GPAs? Schools try to adjust GPAs to the undergraduate schools, adding another mark of uncertainty to the

process. My point here is that we should all cheer if massive quantitative measurements can be abandoned. The fewer the applicants, the greater the opportunity to take care in selection--and the greater the chance for affirmative recruitment by intellectual quality, racial and social characteristics, outstanding character, and personality traits.

Obviously there are problems in the declining applicant pool. Questions of social class and race do need to be addressed, particularly as they have been joined by the trend toward higher fees in the past few years. Few are the medical students whose fathers or mothers are manual laborers. Problems arise, too, from the sheer rapidity of change in the pool (with its 21 percent drop between 1981 and 1987) and concern that medicine will go the way of dentistry--that is, toward fewer applicants and far fewer students. And finally there are problems of financing and debt for all medical students--and what this means.

Others will address these issues specifically. My point here is that too often it is assumed that historical trends should continue unquestioned toward graduate professional education, drawing students from college graduates with unusually high scholastic backgrounds. Schools are still implementing the apparent messages of the Flexner report (1). They have been encouraged to do so in the past through a generally supportive external environment: of foundation grants before World War II and the massive build up of the National Institutes of Health (NIH) and other federal funds after the war, and in shifts in federal policy for expansion and contraction of students over the years--and not the least in the high status (and income) accorded to doctors. The external signals are now unclear, as several speakers noted in the recent review of medical education in *Health Affairs* (4). The federal government is now looking askance at policies making it easier to go to medical school and at restrictive politics that fall heavily on minorities. More important, medicine itself is undergoing a profound and difficult transformation toward recognizing inter alia present-day demographic and morbidity patterns, the possibility of measuring quality and incidence of care, the patient encounter as a process of negotiation between doctor and patient, and the redefinition of science inside and outside the schools. It makes no sense to continue along the old track in a defensive posture rather than to create new opportunities.

My own view is that the present decline in applicants is a correction--away from the inflated figures that distinguished the applicant pool between the late 1960s and the early 1980s. Meanwhile the large number of excellent applicants has created no incentives for major changes in the schools themselves in terms of their teaching mission. Hence the shelving of so many reports. We have suffered in the past from a long history of major reports on medical education, with well-received recommendations, most of which have ended up on the shelf. We have all been to faculty retreats where everyone agrees on ideas for change but very little is actually done to implement them. There is inertia in the schools. And why not? In terms of the historic attributes of money, competitiveness, and size, the schools have been enormously successful in the 20th Century. Until now, at least.

If only because of this inertia, from a strategic point of view it makes sense to regard the present declining applicant pool as a major crisis for the schools. When there is a perception of a major problem, action may be taken. There is now some sense of the need to act because of a feeling of apparent threat to the symbolic center of the schools--medical students. These concerns may finally release faculty in the schools to needed transformations in the late 20th Century.

Possible Changes

What are some of the possible changes? The first two relate to the perceived place of medical education in the academic health center. First, some academic health centers may wish to do without MD programs altogether--and maybe some will in the future. It is certainly an option to be considered. I suggest it only partly tongue and cheek for the

costing of medical education has muddied the waters. If it really costs so much to educate a physician and if some schools appear to be losing a lot of money on their MD program, why continue it? A school could concentrate instead on its research mission, its clinical work, and on educating other health professionals, if these seem to be more cost effective.

Alternatively, it could equally well be argued that the MD program may be very valuable to the center as a flagship program--much more valuable than the actual money brought in from student fees because medical education brings in profit for the center as a whole. Without the MD program there would, perhaps, be fewer grants and fewer patients; perhaps fewer prominent researchers and clinicians; and a less obvious connection with universities. But if one takes this base for cost accounting, the logic is to consider much more internal subsidy of medical students, with ripple effects for the applicant pool. Why not up the grants from internal subsidy and/or cut fees, in order to modify the student body in whatever way the medical school might choose?

A third suggestion is to create a separate teaching faculty or invent a "medical college" within the medical school itself. This might take the form of assigning existing members of the faculty to a relatively small teaching faculty; of reorganizing the medical curriculum into small groups and more individualized teaching; or also possibly integrating medical education more fully with other health sciences preparation, either in the medical school or elsewhere on campus.

A medical college might be able to create more flexible teaching arrangements--and there might be consolidation of at least some of the classroom teaching of two or more local schools into one "college." Another possibility is to open up transfers into medical schools from other health professional programs such as nursing or pharmacy. But the overall advantage of thinking about a teaching faculty is to locate responsibility for educational programs clearly within the schools, with a defined educational budget. If applications continue to decline and the number of first-year students declines in tandem, educational changes may also be easier to implement; for example, reorienting teaching from large lectures to small groups.

Finally, of particular interest to this audience, admissions committees have growing importance in the schools--those unsung heroes and heroines of many decades. In the past, medical school policy has often been made de facto by outside agencies. When the NIH has developed a new program, for example, it has been amazing what initiative has been shown by the schools. For the first time in many decades the medical educational mission of medical schools promises to become of major concern to individual schools. Lacking clear external messages, the challenge of schools today is academic and educational as defined by themselves. In a sense the wheel has come full circle. What is it the schools will want to do?

References

1. FLEXNER, A. *Medical Education in the United States and Canada: A Report to the Carnegie Foundation for the Advancement of Teaching.* Bulletin No. 4, Boston, Massachusetts: Updyke, 1910.

2. RAPPLEYE, W. C. (Director). *Medical Education: Final Report of the Commission on Medical Education.* New York: Association of American Medical Colleges Commission on Medical Education, 1932.

3. DEITRICK, J. E., and BERSON, R. C. *Medical Schools in the United States at Mid-Century.* New York: McGraw-Hill Book Company, 1953.

4. IGLEHART, J. K. (Ed.) The Case for Medical Education Reform. (Supplement). *Health Affairs*, 7: (No. 2), 1988.

Trends in the Characteristics and Academic Qualifications of Medical School Applicants

Cynthia G. Tudor, Ph.D.

Over the past eight years the number of students applying to U.S. medical schools has dropped from its highest level of over 40,000 applicants in the 1970s to about 37,000 in 1981--the highest of this decade. Its present level is an estimated 26,347 applicants for the 1988 entering class for 127 U.S. medical schools. Not since the entering class of 1970 when there were only 101 medical schools in the U.S. has this figure been so low. Indeed, the number of applicants applying to medical school seems to be reason for concern.

The number of applicants has additional meaning for those schools that rely on in-state students to fill the majority of their positions. Figure 1 shows those states experiencing more than 25 percent decline from 1981 to 1987 in the number of applicants. In 1986, only 14 states experienced such a decline. In 1987, 25 states experienced a 25 percent decline. In 1988, an estimated 38 states will experience a 25 percent or more decline in the number of applicants. States projected to experience a decline in 1988 that had not previously experienced a decline either in 1986 or 1987 include Alaska, Arizona, Arkansas, Colorado, Florida, Indiana, Louisiana, Massachusetts, Missouri, Nebraska, New Jersey, New Mexico, and Tennessee.

Coupled with this discouraging picture of the number of medical school applicants is the issue of the academic qualifications of these applicants. AAMC staff annually examine academic qualifications in terms of Medical College Admission Test (MCAT) scores and grade-point averages (GPAs). These staff members meet on a continuing basis, argue, write copious memoranda and reports in an attempt to fairly, and explicitly describe to AAMC constituents and medical school deans, the trends in academic credentials. We are especially aware that we have few measures by which we can gauge the extent to which qualifications of medical students can drop before attrition, the quality of physicians, or the quality of health care is affected negatively.

In 1986, Dr. Beran and I wrote an article describing the changes in the academic qualifications of the 1985 entering class. We concluded that the qualifications of 1985 applicants had actually improved, relative to the qualifications of applicants in 1981. These positive changes held when we examined MCAT scores by sex, race, and age. We demonstrated that there were significant but modest gains in the percentages of men and women who scored from 10 to 15 on the MCAT biology, chemistry, physics, and science problems tests. There were also significant gains on these MCAT subtests for most racial groups (1). We repeated these analyses for the 1986 and 1987 entering classes. For each of these classes, AAMC staff generally agreed that there was little evidence to support the claim that the academic qualifications of medical school applicants had declined, relative to their 1981 level, but rather that academic credentials were unchanged.

However, upon reviewing the characteristics of the applicants to the 1988 entering class, we find that academic qualifications appear to have declined slightly. Average MCAT scores for 1988 applicants have declined relative to average 1981 scores in chemistry, science problems, and reading and quantitative skills. These declines range from 1/100 to 21/100 of a point. Average physics scores are presently equal to those of 1981; and average MCAT biology scores remain higher than their 1981 level. These findings are substantially different from 1987 when the average for each science MCAT score (i.e., biology, chemistry,

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physics, and science problems) exceeded the 1981 average.

These figures demonstrate the changes. For chemistry, note in Figure 2 the solid line for 1988. In each case, the distribution of scores for 1988 applicants appears to shift toward the left, signifying a greater proportion of lower scores, relative to 1987 and 1981 applicants. In order to give you a handle on what these changes mean, we have presented this figure in a different way. In Figure 3 we have grouped the scores into four MCAT score categories, 1-6, 7-8, 9-11, and 12-15. This clearly shows the increase in the percentage of applicants scoring in the lowest level (1-6), with decreases in the percentage scoring in the middle ranges, 7-8 and 9-11. In addition, while the line is essentially flat over time for the 12-plus range, the number of applicants in that range has clearly decreased.

The distribution of science problems scores and reading scores can be seen in Figures 4 and 5. Both show that the distribution of scores is shifting to the left, signifying a higher frequency of lower scores.

Unfortunately, reports of the spring 1988 administration of the MCAT indicate that these declines will continue. Average test scores for the 1988 spring MCAT show decreases of 3/10 points for quantitative skills, 2/10 for chemistry and reading, and 1/10 for the remaining tests since spring 1987. Thus, the academic qualifications of the 1989 applicant pool will probably continue to decline.

Grade-point averages have also continued to decline. Biology, chemistry, physics, and mathematics GPAs declined from 3.24 in 1981, to 3.21 in 1987, to 3.18 in 1988. Some experts consider GPA declines during the early 1980s to be evidence of an end to the grade inflation observed in the late 1970s. However, it seems to me that declines in GPA have probably ceased to be due to changes in grading practices and are now the result of real decreases in the grade-point averages of applicants. Figure 6 demonstrates these changes. The solid line shows the distribution of scores for 1988 applicants. It lies below the lines for 1987 and for 1981, signifying a lowered frequency of higher GPAs.

In conclusion, the number of applicants applying to medical school for the 1988 entering class has dropped to the lowest level since 1970. In addition, academic qualifications have generally declined to levels slightly below what they were in 1981. The extent to which these declines imply negative changes in the quality of physicians that medical schools graduate is still unclear. However, it is clear that the medical school population is more diverse in terms of its academic qualifications.

Other Characteristics

Findings on other characteristics of the applicant pool are more positive. First, gender. Approximately 9,700 women applied to enter medical school in 1988. Women comprise about 38 percent of the 1988 applicant pool. This represents about a one percentage-point increase over the 1987 level. While the proportion of women has dramatically increased since the middle 1970s, women are somewhat underrepresented in medical school. Women comprise only 36 percent of the medical school matriculants, but they receive almost 41 percent of the biomedical degrees.

Second, ethnic or racial identity: underrepresented minorities comprise about 12 percent of the applicants to the 1988 entering class. Their proportional share has increased from 10.6 percent in 1987 and 9.6 percent in 1981. Thus, minority representation in the applicant pool continues to improve.

Other changes have also been observed in the characteristics of the applicant pool. While these changes do not necessarily have a direct effect on the academic qualifications of applicants, they do affect the type of students and physicians in the future. First, there have been changes in the age distribution of students. In 1978, almost 90 percent of the medical school applicants were under 28 years of age. In 1987, only 84 percent of the applicants were in this age range.

Age, alone, has few important consequences to medical schools. However, older students

are more likely to have other characteristics as well. For example, they are likely to be less well prepared for medical school since they have been out of undergraduate school for a longer time. Conversely, they are likely to be more mature than younger students. Second, they are less likely to have financial support from their parents and therefore are in need of additional financial aid from the medical school. Third, older students are more likely to be married and have the emotional burdens of a spouse and/or children. The decrease from 1978 to 1987 in the percentage of applicants who are married is consistent with the national trend of individuals delaying marriage until they are older. However, when we stratify by age, we find only 14 percent of matriculants under 28 are married, compared to 47 percent of the matriculants over age 28. This is almost a three-fold difference.

Finally, when we look at socioeconomic status, we find that a greater percentage of applicants come from a family in which the mother is employed, a percentage higher than the national average of about 60 percent. The percentage of mothers of applicants who work outside the home has increased from about 67 percent in 1978 to 81 percent in 1987. Fathers' occupations have changed only slightly over time and now include a higher percentage of professionals, and a lower percentage of sales persons, managers, and manual laborers. In addition, a higher percentage of fathers of applicants, but not mothers of applicants, are either unemployed, retired, or deceased. This observation is consistent with the aging phenomenon evidenced in the general population.

In summary, the percentage of women applicants has again increased, as has the proportion of underrepresented minorities who apply to medical school. The proportion of older students applying has also risen. These students are more likely to be married. Finally, we see that a greater proportion of the mothers of applicants work, accompanied by a decrease in the diversity of the occupations of the fathers.

The Future

In January, 1987 the AAMC Task Force on Physician Supply was established to explore the consequences of a two-fold increase in the enrollment of U.S. medical schools over the past two decades. The committee charged with studying the implications of physician supply for medical education is in the process of deriving applicant projections. These school-specific projections are not yet available.

Preliminary work done by the committee on projecting the numbers of applicants was based on Bureau of the Census estimates of population by age, race, and sex. Analysis of these preliminary projections, compared to a review of the history of the number of applicants, showed that the ratio of medical school applicants to population did not appear to be a constant over time. That is, the number of medical school applicants varied by a factor not directly related to population.

Figure 7 depicts the historical picture. The top, broken line, shows undergraduate degrees in biomedical sciences, chemistry, and physics from 1960 to 1985. The middle, dashed line, shows the civilian population, ages 20 to 29 years for the same time period. The bottom, solid line, shows medical school applicants from 1960 to 1988. If there were a constant ratio of applicants to population, the line for applicants would, more or less, remain at a constant distance from the line for the civilian population. It does not. Indeed it changes, peaking around the middle 1970s and dropping during the middle 1980s.

One explanation for the variability in the ratio is the changing distribution of applicants by sex and racial-ethnic identity. In addition, the upswing during the 1970s might be attributed to the influx of Vietnam veterans. However, these two changes do not seem sufficiently significant to account for the dramatic upswings and downswings in applicants apparent from this figure. Instead, the difference might be attributed to students' interest in and perceptions of medicine.

In the 1988 AAMC Premedical Questionnaire, administered to students registering for the spring 1988 MCAT examination, 1989 potential applicants were asked to rate the extent to which they agreed with thirteen different statements about medicine. A similar set of statements appears in the Matriculating Student Questionnaire, administered to first-year entering students.

The results from the Premedical Questionnaire reveal interesting information about the attractiveness of medicine. Almost 61 percent of these potential applicants thought, "Medicine will not be as financially rewarding in the future as in the past." Seventy-eight percent thought; "Changes in the health care system are impairing physicians' independence." Ninety-five percent thought, "Physicians' legal liabilities and the high cost of malpractice insurance are major problems." These and other results of the Premedical Questionnaire imply that potential applicants tend to agree with those negative statements customarily expressed about medicine.

However, these potential applicants also tend to perceive many positives about medicine: "Opportunities to build a successful practice are always available to physicians who work hard" (81.7 percent); "Having interesting and intelligent colleagues is a major benefit of being a physician" (84.4 percent); and "Advances in the biomedical sciences and their application to the care of patients will make being a doctor more stimulating, challenging, and fulfilling in the future" (96.8 percent).

To contrast briefly the perceptions of medicine of the 1989 potential applicants with those of 1987 entering class, first-year students are the same as or are more positive of medicine, in terms of opportunities, interesting colleagues, and the challenging future of being a physician. Second, they are more realistic than potential applicants about the limits of medicine. That is, they are more likely to perceive medicine as less rewarding, more limited in the future in independence, and having excessively high legal liabilities.

The lesson to be learned from these data is that both potential applicants and matriculating students recognize the limitations of medicine. However, medicine also has attributes that are jointly perceived by these two groups of individuals as positive.

In order to improve the academic qualifications and diversity of medical school applicants in the future, attention must be directed toward capitalizing on the positive aspects of medicine. Simultaneously, these individuals involved in medical education and recruitment must work to minimize the negatives of being a physician. In this way, the gap between the population available to medicine as potential students and the number of applicants will narrow. The future of the medical school applicant pool depends on this.

Reference

1. TUDOR, C. G., and BERAN, R. L. Changes in the Qualifications of Medical School Applicants, 1981 to 1985. *J. Med. Educ.*, 62:562-571, 1987.

Figure 1. States with over 25% decline in medical school applicants, 1981–1987.

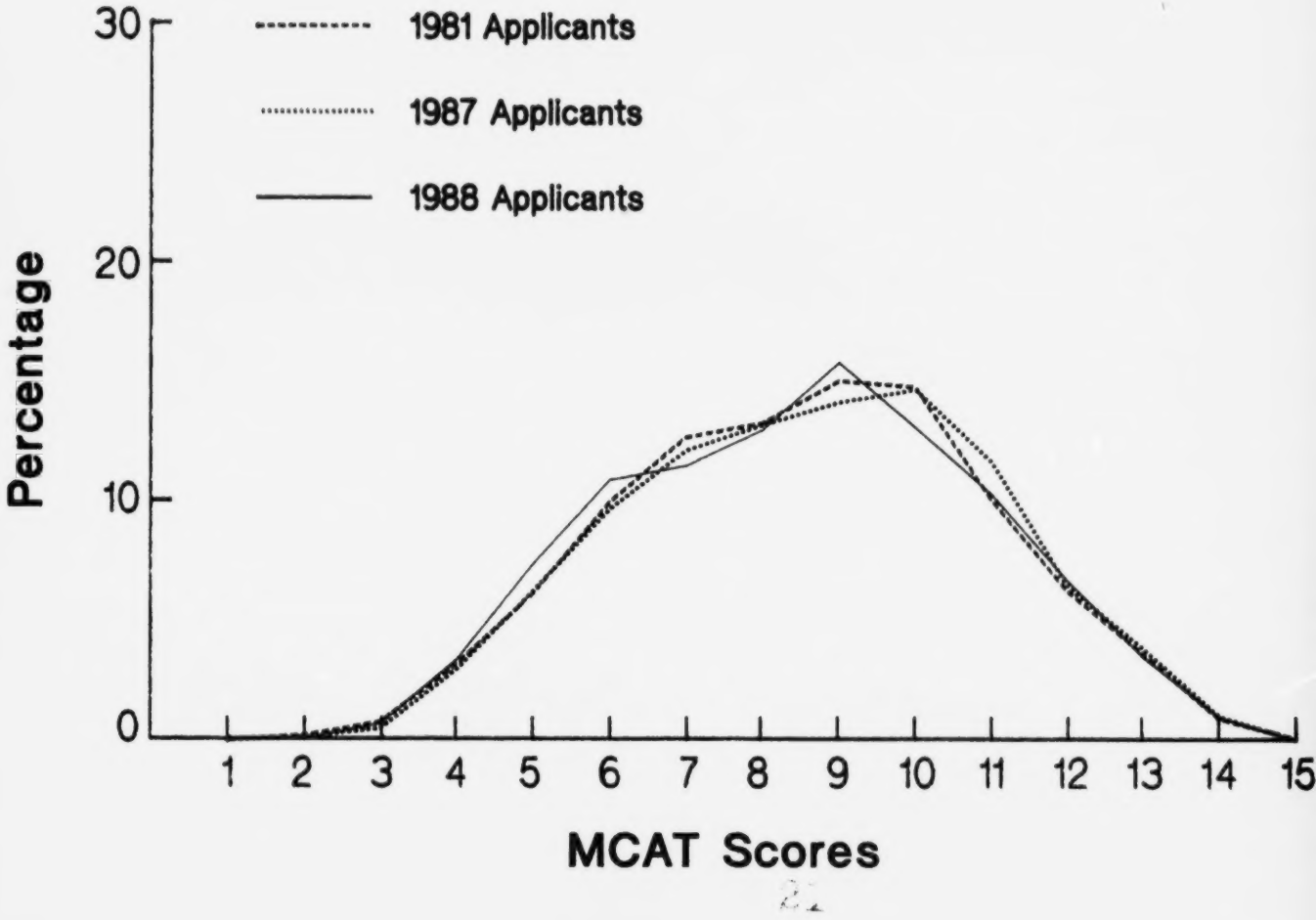

Figure 2 MCAT chemistry scores for applicants, 1981, 1987 and 1988.

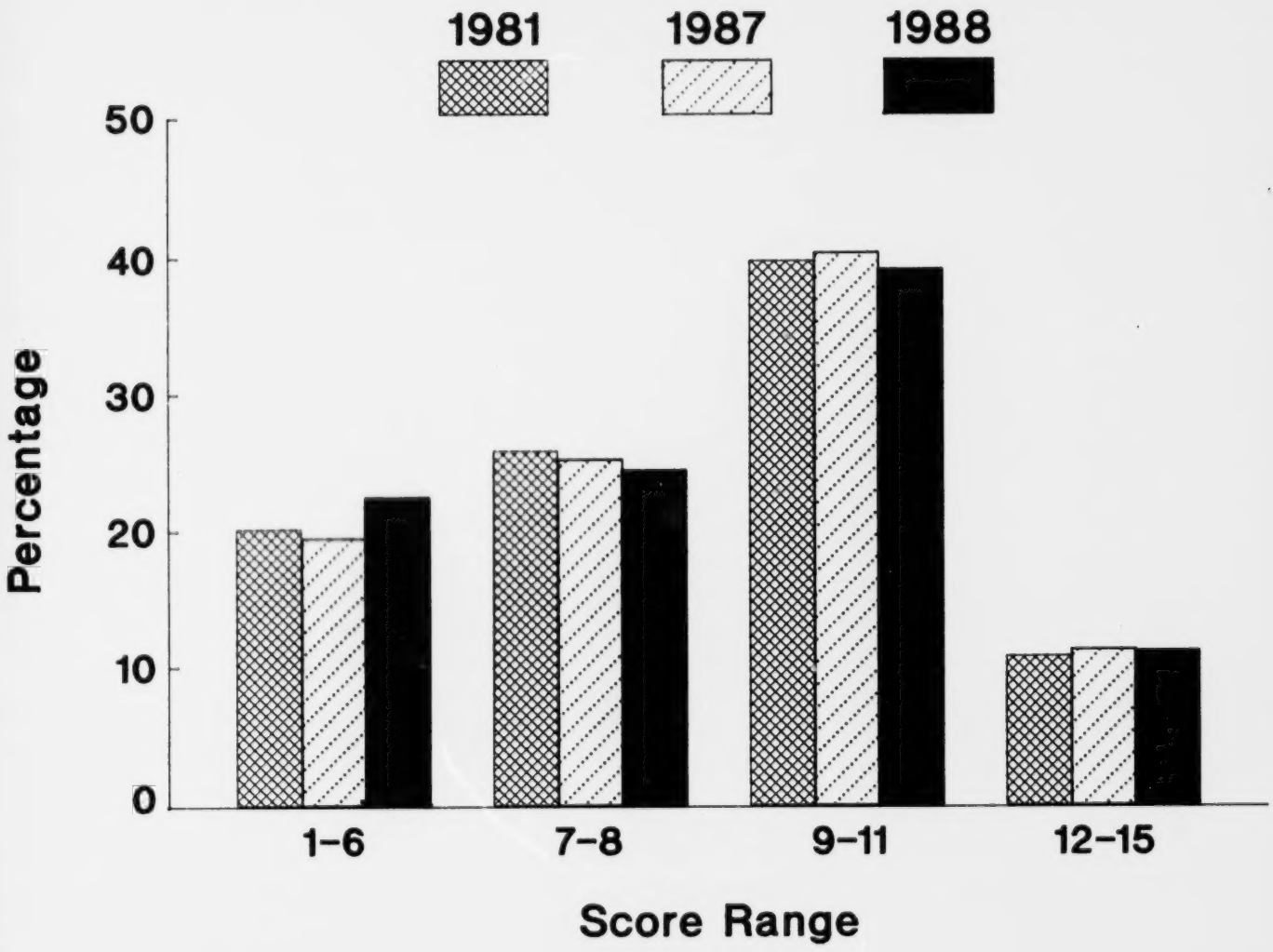

Figure 3. MCAT chemistry score ranges for applicants, 1981, 1987 and 1988.

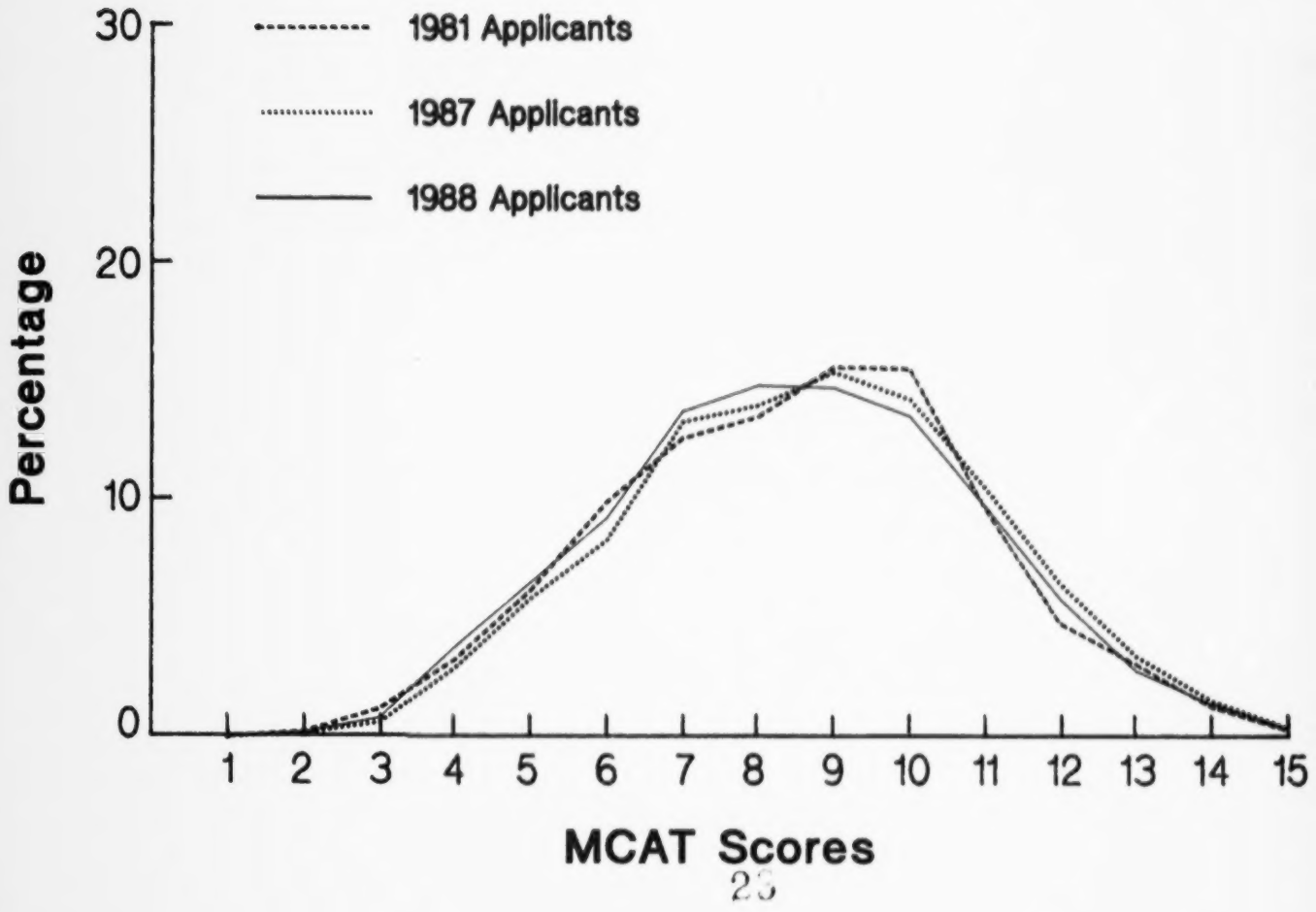

Figure 4. MCAT science problems scores for applicants, 1981, 1987 and 1988.

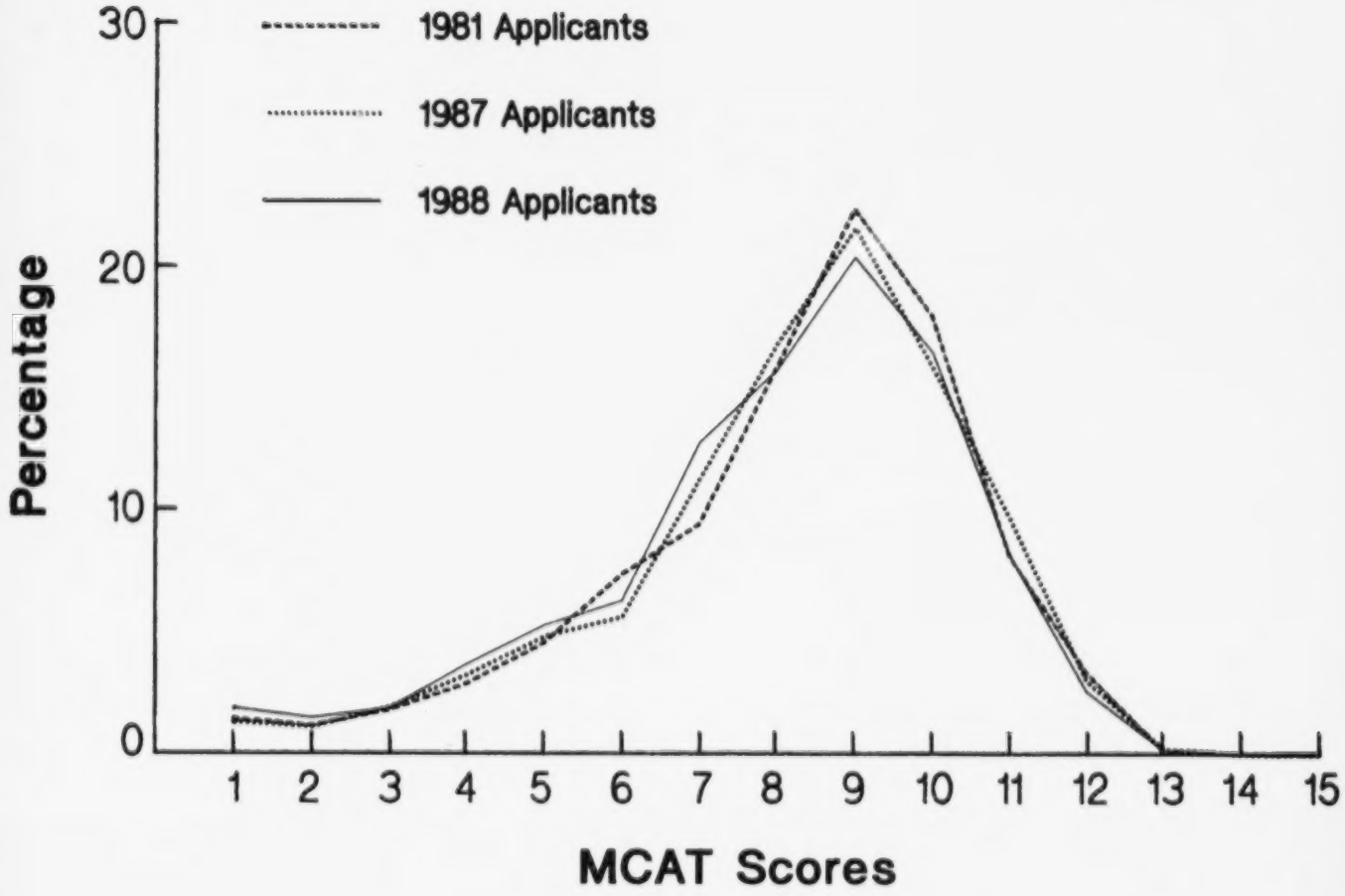

Figure 5. MCAT reading scores for applicants, 1981, 1987 and 1988.

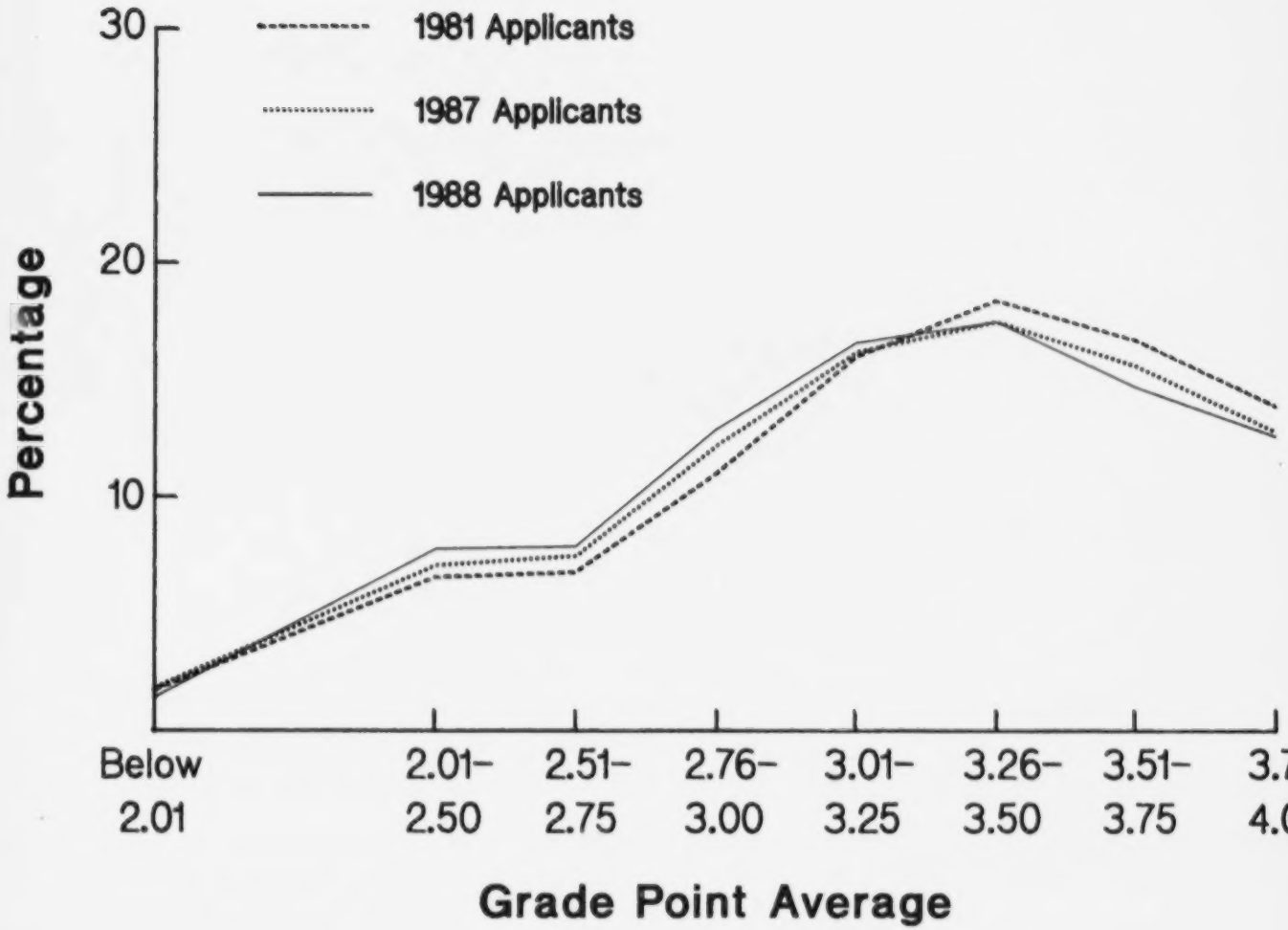

Figure 6. Science grade-point average of applicants, 1981, 1987 and 1988

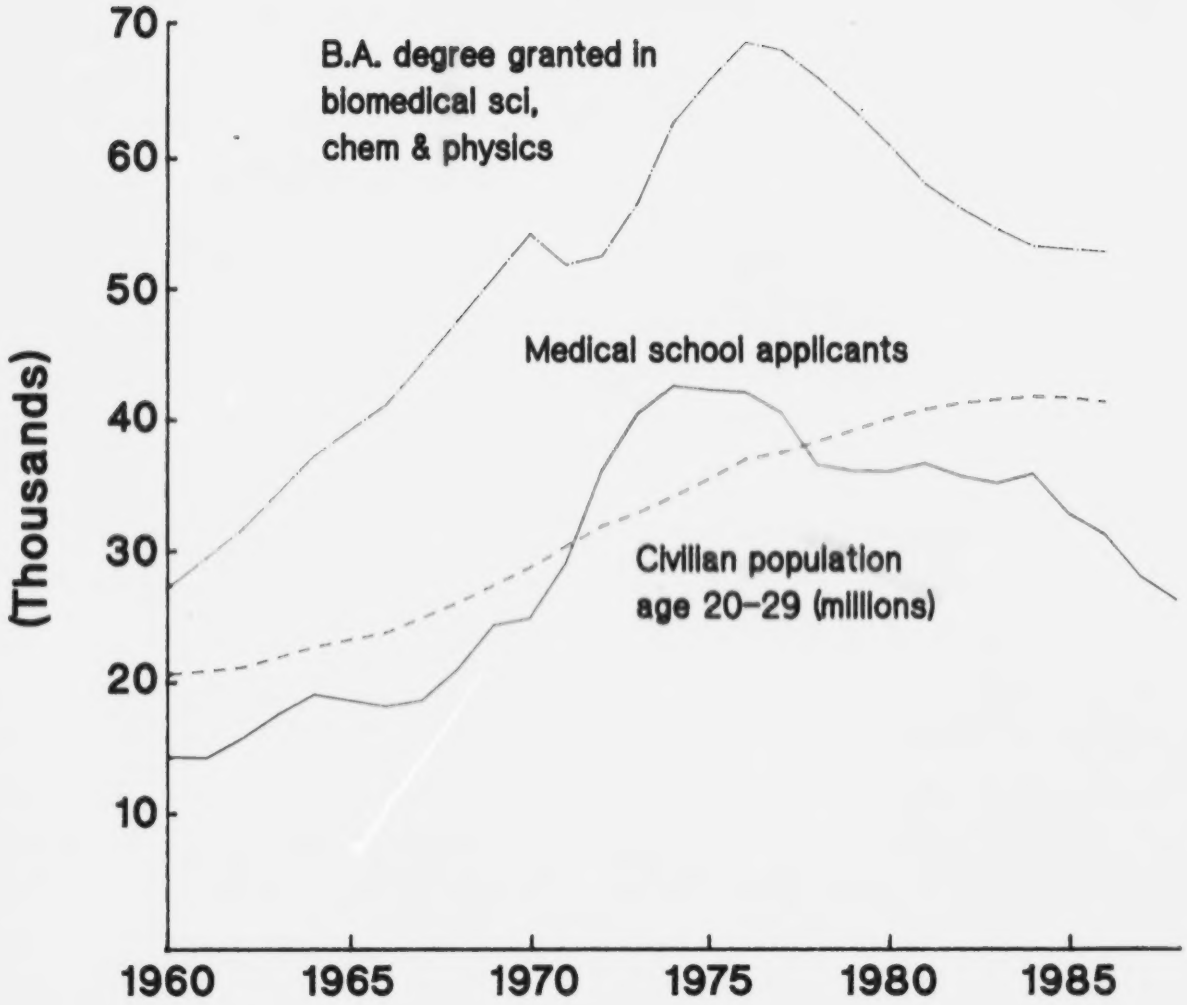

Figure 7. Science degrees, population, and medical school applicants, 1960–1988.

Increasing Minority Enrollment in an Era of a Declining Applicant Pool

Russell L. Miller, M.D.

Introduction

Minorities continue to be underrepresented in the medical schools of this country and in the profession of medicine. Blacks, for example, represent approximately 12 percent of the nation's population but only 6 percent of total medical school enrollment, 5 percent of medical school graduates, 4 percent of postgraduate trainees, 3 percent of physicians in practice, and 2 percent of medical school faculties. Too little progress has been made in increasing the representation of minorities since the mid 1970s. Why has more progress not been made? What are the prospects for future progress? What can and should be done in the environment of a declining applicant pool to ensure that progress is made?

Background

Prior to Reconstruction, only a handful of blacks in this country were trained as physicians. Early black practitioners, many of them slaves, received their training from white physicians to whom they were assistants. The first American black to receive university training as a physician was Dr. James McCune Smith who was granted a medical degree from Scotland's University of Glasgow in 1837. The first black to graduate from a U.S. medical school was reportedly David Peck who graduated from Rush Medical College in 1847. Progress of blacks and other minorities in gaining access to medical schools was painstakingly slow for the next 100 years.

As late as the end of World War II, one third of the approved medical schools in this country were closed to blacks and most other minorities. The first of these schools to desegregate was the University of Arkansas in 1948 when it enrolled Edith Irby, now Dr. Edith Irby Jones. In the 1960s, pressure against segregation in other areas of American life soon began to be felt by the medical schools of this country. The year 1968 can be considered to be a turning point with regard to efforts to expand the number of blacks in medical education. In that year, the year of Dr. Martin Luther King's assassination, the Association of American Medical Colleges (AAMC) committed itself to affirmative action programs and became actively involved in such efforts. Spurred on by federal programs to expand medical school enrollments, by programs of federal assistance to medical students, by federal programs supporting special programs to increase minority enrollment, by activities of the AAMC, and by continued pressure from civil rights activists and community groups, black enrollment in U.S. medical schools climbed steadily from 783 in 1968-69 to 3,884 in 1974-75.

Current Problem

Since 1975-76, the number of minorities accepted to U.S. medical schools has fluctuated slightly, but basically has remained level, between 1,500 to 1,600 students, each year. The number of black applicants peaked at 2,644 in 1981-82 and declined to 2,388 in 1986-87. The number of black and other under-represented minorities enrolled in U.S. medical school first-year classes between 1977 and 1987 is contained in Table 1. While I know of no study of the reasons for the leveling off in the number of blacks admitted and the decline in the number of black applicants, several factors have been offered. These include the backing away from the commitment to affirmative action by some

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TABLE 1

SELECTED MINORITY GROUP ENROLLMENT IN THE FIRST-YEAR CLASSES IN U.S. MEDICAL SCHOOLS

Year	Black American N (%)	American Indian N (%)	Mexican American N (%)	Mainland Puerto Rican N (%)
1977-78	1,085 (6.7)	51 (0.3)	246 (1.5)	68 (0.4)
1978-79	1,061 (6.4)	47 (0.3)	260 (1.6)	75 (0.5)
1979-80	1,108 (6.5)	63 (0.4)	290 (1.7)	86 (0.5)
1980-81	1,128 (6.6)	67 (0.4)	258 (1.5)	95 (0.6)
1981-82	1,196 (6.9)	70 (0.4)	300 (1.8)	105 (0.6)
1982-83	1,145 (6.6)	62 (0.4)	305 (1.8)	114 (0.7)
1983-84	1,173 (6.8)	75 (0.4)	301 (1.8)	109 (0.6)
1984-85	1,148 (6.8)	77 (0.5)	329 (1.9)	118 (0.7)
1985-86	1,117 (6.6)	60 (0.4)	331 (2.0)	136 (0.8)
1986-87	1,174 (7.0)	61 (0.4)	331 (2.0)	111 (0.7)
1987-88	1,221 (7.3)	68 (0.4)	308 (1.8)	116 (0.7)

N= number enrolled; (%)= % of total first-year enrollment

Note: U.S. citizens were redefined in 1981 to include students with permanent resident visas.

Source: AAMC Section for Student Services (Fall Enrollment Survey)

medical schools, following the Bakke decision; erosion in the quality of the general education of blacks at the elementary, junior high school, high school, and college levels; increasing tuition costs, which make attending medical school a less viable alternative for minorities who disproportionately come from low income families; increasing interest among minorities in other career choices, which will provide an economic return earlier than medicine, most notably business and industry, engineering, and computer science; decreasing availability of grants and scholarships resulting in high levels of indebtedness for many medical school graduates; the general conservatism of the country; and the deteriorating image of the profession, which has been tarnished by media focus on the problems of oversupply of physicians and medical malpractice suits. Given the widespread publicity directed to technological advances in medicine, such as organ transplants, it could also be possible that medicine now is viewed more as a technical field, as opposed to one of the service professions that have traditionally been more attractive to blacks. The specter of AIDS, which is disproportionately prevalent in black communities, certainly has not helped to encourage blacks to enter medicine. Also, like many of their white counterparts, some minority physicians, today, wonder aloud if they have made the right career choice and express dissatisfaction with medicine as a profession.

All of these factors have probably contributed, in some way, to the current stagnation in minority medical school enrollment. The prospects for attracting more minority students into the profession are not bright, unless significant interventions are initiated now. Alarming is the report by the American Council on Education, that between 1975 and 1985 the percentage of black high school graduates who were attending college declined (1). This same report points out that at the graduate level, the fall off for blacks is dramatic. Between 1976 and 1985, the number of blacks earning master's degrees declined by 32 percent and the number of blacks earning doctorates decreased by 5 percent overall and the decrease for black men was 27 percent. This data suggests that the number of black college students, the pool from which black medical students are drawn, is not increasing proportionally to the capacity of medical colleges. The data also suggests that although increased opportunities in careers outside of medicine may have attracted some talented black students who might have gone to medical school, there has not been an increase in the number of blacks who have received graduate training in other disciplines.

A factor that must also be examined is the quality of the applicant pool. Blacks, for example, continue to present mean Medical College Admission Test scores and science grade-point averages that are significantly below the means of whites. However, the gap has been closing. For example, in 1978, the mean chemistry MCAT score for white applicants was 8.74 versus 5.37 for black applicants, a difference of 3.01. By 1986, the same means were 8.96 versus 6.35, a difference of 2.61. It would be expected, therefore, that acceptance rates for blacks, relative to that for whites, would be increasing; the opposite has been true. While the acceptance rate for black applicants increased from 38 percent in 1976 to 44 percent in 1986, the acceptance rate for all applicants during this period increased to an even greater extent--from 37 percent to 55 percent.

Significance of the Problem

Why is it important that U.S. medical schools educate increased numbers of minority physicians? Will not the increased numbers of white physicians in this country be able to care for the minority population? While it is true that white physicians can and do provide quality medical care to minorities, I believe that, statistically speaking, better care will be provided to minority communities by minority physicians. This belief is held not because minority physicians have better technical skill or a better knowledge base or more compassion, but because minority physicians have a better understanding of the cultural

and social context of illness and disability among the members of their own communities and can communicate better with patients in these communities. According to the 1985 report of Mrs. Margaret Heckler, then Secretary of Health and Human Services, "There is a pronounced and stubborn disparity between the health status of minority Americans and that of non-minority Americans" (2). The report found that are more than 60,000 "excess deaths" each year among America's minority citizens. Minority physicians are also more likely to practice in a community or facility that is medically underserved, thus improving access to health care in this country. Training more minority physicians is also important because they tend to be leaders and role models in communities that may be bereft of such individuals. Lastly, graduating more minority physicians is important because from this group will be derived the minority medical school faculty and researchers of tomorrow. Efforts to increase the numbers of minorities in academic medicine will be futile without a preceding increase in the number of black medical school graduates.

Possible Solutions

The problem of minority enrollment in medical school must be approached at multiple levels, including pre-college, college, and medical school. Addressing the problem must involve the medical schools of this country in a variety of alliances with diverse groups. Some of these relationships will be traditional, that is, with premedical advisers. Others will be new, for example, with public school systems and community organizations. A comprehensive intervention program to increase minority enrollment will minimally have the following components:

1. Pre-college programs should begin early in the educational process. Pre-school is not too early. A team approach should be used to design, implement, and evaluate pre-college programs. Students, parents, teachers, community leaders, and physicians should be involved in the team.

2. Undergraduate education is the next component. Transition between high school and college should be facilitated. Summer programs for minority pre-medical students designed to strengthen their motivation and fortify their academic skills should be offered. Time management, test-taking, and study skills should be enhanced through special programs. Extensive personal, financial, and career counseling should be provided. To enrich the growth and development of students, support groups should be developed and used actively.

3. Improvement of opportunities in medical school should begin with improved use of traditional measures of academic potential--grades, MCAT scores, interviews, and letters of recommendation--in the selection of minority students and medical school. Useful nontraditional measures for selection of minority students for medical school should be identified and utilized. Pre-admission programs that yield qualified minority medical school applicants, including post-baccalaureate and summer programs should be expanded. Academic progress of students should be monitored closely and effective academic support programs should be provided. Support groups should be developed and used actively to enrich the growth and development of students. Extensive financial and career counseling should be provided. Students should be encouraged to accept a part of the responsibility for their medical education.

Most of the medical colleges have made good faith efforts since 1968 to improve opportunities for minorities to receive a medical education. Each college, however, could do more. Although I cannot offer solutions, I can offer some suggestions.

For starters, I believe in the mentor relationship. Most researchers have had mentors during their training and this system has worked well. Whenever I think of a mentor, I recall Homer's description of Athena disguising herself as an old man and becoming the mentor for Telemenicus, in order to train him to accept responsibility; to teach him the right things to do; to show him how to make the right decisions. A mentor actively participates in the development of a

student. I believe that offering more minority students a mentor relationship with a physician will enhance the students' interest in the medical profession and improve their academic preparation for the study of medicine.

My specific suggestions for enhancing minority enrollment, retention, and graduation by medical schools follow:

1. Do not abandon the affirmative action approach; expand and build on programs already in place.
2. Involve the top leadership of the medical school (resources must be available and success rewarded).
3. Develop an integrated approach: minority recruitment and enrollment cannot be separated easily from programs of financial aid and personal and career academic counseling.
4. In order to recruit minority students, go to campuses where a large number of minority students are likely to be located, for example, the historically black colleges and universities. Look up the records of minority students who have been successful at your school previously. Where did these students come from? Use minority faculty networks, personal contacts, alumni, students, and so on. Develop new networks. For example, talk to the local high school counselors to find out to which colleges the minority students are going and get the names of those who express an interest in medicine.
5. Medical schools are some of this nation's finest educational resources. If 100 medical schools would take 25 bright black students who are in the seventh and eighth grade for instruction after school, during school, and on Saturday and provide for motivating experiences designed to prepare them for high school and college science courses, and instill in them the desire to become physicians, in a few years, the black applicant pool would more than double.
6. Create an academic atmosphere that nourishes and encourages minority students to succeed. Insist on excellence and recognize and reward scholastic excellence. Insist on programs that identify students in academic difficulty before they fail and give individual academic and personal counseling. The medical school community must value cultural diversity and respond powerfully to incidents of racism.
7. Your most effective and enthusiastic recruiters can be your students and alumni. Involve them in your efforts.
8. Make use of existing state, federal, and private grant programs, such as Health Careers Opportunity Program (HCOP). There is no reason why new programs cannot be developed that are funded from the combined resources of the Department of Education, the Department of Health and Human Services, and other federal and private agencies, which will have the goal of increasing the minority applicant pool, the number of minority matriculants, and the number of minority graduates from U.S. colleges of medicine.
9. Set realistic goals.
10. Start a program today--even if it is small. Be patient and persistent. Develop an agenda and structure that is simple, straightforward, focused, and that can be kept before the institution at all times. Make excellence and commitment the hallmarks of your program.

We know that minorities can succeed in medicine when they are given opportunities and motivated properly. Minorities will represent up to 30 percent of the college-age population by the year 2000. If our schools and the medical profession are to be reflections of the best in our society, this large segment of American citizens cannot be ignored. More importantly, regardless of our own personal aspirations for our college of medicine, it is the right thing to do. A recent report (1) reflects the crisis we face today:

"We must bring the problems of race, unemployment, poverty back into the public consciousness, put them back on the public agenda. These problems also belong on the private agenda of each and every American. The existence of a permanent underclass made up primarily of members of minority groups is inconsistent with our national ideals.

"It is a threat to our democratic system, which can succeed only by extending, to every citizen, an opportunity to share in the nation's life and prosperity."

References

1. American Council on Education and the Education Commission of the States. *One Third of a Nation: A Report of the Commission on Minority Participation in Education and American Life*. Washington, D.C.: American Council on Education, 1988.

2. *Report of the Secretary's Task Force on Black and Minority Health.* Margaret M. Heckler, Secretary, U.S. Department of Health and Human Services. Washington, D.C.: U.S. Government Printing Office, 1985.

Educating in an Era of a Declining Applicant Pool

Louis J. Kettel, M.D.

The applicant pool to medical school is declining in total numbers, but first-year class size is not declining at the same rate. Therefore, it is not surprising that the characteristics of the medical school matriculants are changing. The matriculating students are older and more have non-traditional backgrounds. More matriculants are being selected from the pool of applicants with lower grade-point averages (GPAs) and Medical College Admission Test (MCAT) scores.

It would take significant reductions in class size to match these downward trends in the applicant pool. Furthermore, initiatives to admit more underrepresented minority applicants and to meet local medical school missions (such as contracts with neighboring states--Jefferson University and Delaware; WAMI) have not changed. On the input side, actions to reverse the negative environmental forces and to implement positive strategies directed toward increasing the applicant pool size will be some time in coming. Thus, the recent broadening of medical school matriculant qualifications is likely to continue for some years.

Implications for Admission

There are many reasons for the varying performance levels of applicants that result in GPA and MCAT scores.

1. Some variation results from differing levels of learning skill; some from lack of skill in the various modern educational methods, such as the use of computer-assisted instruction; some from more individual-specific, ability gaps, such as in the use of the problem-solving approach; and some from varying ability to self-direct and self-motivate. The sum of these factors results in differing learning rates and the value and priority each matriculant gives to learning.

2. Recognizing these diverse backgrounds, the faculty may well expect a higher than usual attrition rate. At a time of competitive admissions practices, a high attrition rate could be public relations trouble.

What precisely might happen in the nation's medical schools? I see two scenarios with other possible combinations between the extremes.

At one extreme, our medical schools could maintain the teaching status quo and allow students to succeed or fail without regard for their more varied background. Such a choice of behavior would deprive the faculty of the excitement that these new and varied backgrounds could stimulate in medical education. Just think of what an older student with a bachelor's degree from some years past might bring--especially if there had been work experience in a non-health-care setting. Think of the insights brought through better representation of women and underrepresented minorities. Then there is the intellectual cross-fertilization from more matriculants coming from non-science undergraduate majors. This is a unique opportunity to teach in a setting with challenging students contributing from insights we have seldom seen.

If we ignore the diversity among the new matriculants and leave things as they are, these students may not do well, either socially or educationally, in the traditional curriculum

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setting of North American medical schools. Socially, students might well lack peer support groups to carry them along. Who will be the peers of the 35-year-old father of three pre-teens? Of the 32-year-old nursing administrator entering medicine now after being denied admission 10 years earlier? Of the black student with weak first and second years of premedical education now admitted under a summer enrichment program? These will be the very people in the 7-10 percent attrition rate, I predict. This scenario might be avoided with some special effort on the part of schools.

In scenario number two, at the other extreme, is an innovative approach. This more responsive approach will require curricula with appropriate relief of the pressure on learning time. It cannot be lock-step. It must teach self-learning and emphasize methods of problem solving. Faculties more than ever will need to define learning objectives precisely to accommodate these approaches and will need to accommodate variations in ability and methods of learning.

The new approach will need to create more innovative learning environments, such as in ambulatory care where a slow pace is economically disastrous. There will need to be adequate time in the education system for a spread of different learning rates. And the faculty will have to establish clearly defined evaluation parameters and provide appropriate remediation methodologies.

These observations and recommendations sound like the recommendations from the GPEP report. And well they should. The educational changes suggested because of the changing applicant/matriculant pool are long overdue and should be made anyway.

Implementation Strategies

What are some of the implementation problems and results if one chooses to accommodate the new matriculant?

1. Teaching objectives and course/learning goals will have to be more precise. Developing them will bring new enforcement challenges for medical school curriculum committees.
2. The actual curriculum length from entry to the first postgraduate year (PGY-1) may be longer than four years for some. This adds to costs for the institution and translates to increased student debt burden--both as tuition additions and as extra years of living expense.
3. Remediation may become a common event. Do we have enough summer courses? Will more schools allow flexibility for students to recycle within their own curriculum?
4. Legal challenges will result when students fail and are asked to leave the school. Here is where the learning objectives will be tested for precision.
5. New costs will accrue to the schools. These may be investments into self-learning techniques, such as computers, new course syllabi, new learning environments, and summer enrichment or remediation courses. Hence, the price of holding class size by accepting lower/different quality applicants may well be high.
6. Changes in the number of PGY-1 positions and the number of positions in some of the specialties will continue. Career choices may well be limited. Indeed, some programs may look at the new matriculant and view the characteristics as negatives and decline to accept them into programs. The student who learns at a slower rate than that expected by the traditional school curriculum may be stigmatized and bypassed.
7. Career counseling based on a thorough analysis of realistic goals and expectations will be important.
8. Program directors will have to be taught to interpret the non-quantitative data about these students. Simulations as we have done for the minorities and the admissions committees will be in order.
9. The characteristics of dean's letters of recommendation will have to be reviewed. The proper interpretation of curriculum length and the rate at which a student traverses this curriculum, of learning in different ways, and of self-directed study will need to be included.

Conclusion

Medical schools have responded to change in the past. They will again. I believe that assertive, positive actions along the lines of the second scenario I have depicted are beginning to take place. With the appropriate anticipation, planning, and implementation, medical schools will not only meet the needs of the new matriculant, they will also provide a better educational system for all students.

PART 2

Using AAMC Data In Admissions

Data from AAMC Medical School Applicant and Matriculant Questionnaires 33
Cynthia G. Tudor, Ph.D.
Data from AAMC Operational Files 35
Richard R. Randlett
Data from AAMC Student and Applicant Information Management System 37
Charles D. Killian
Data from AAMC Institutional Profile System, Faculty Roster, and Hospital Surveys 39
Paul Jolly, Ph.D.

Data from AAMC Medical School Applicant and Matriculant Questionnaires

Cynthia G. Tudor, Ph.D.

The AAMC administers, processes, and analyzes information from over 48,000 questionnaires completed by prospective or actual medical students on an annual basis. The three student questionnaires include the Pre-Medical Questionnaire, administered as part of the MCAT registration process; the Matriculating Student Questionnaire, administered to first-year medical students; and the Graduation Questionnaire, administered to final-year medical students.

The Pre-Medical Questionnaire (PMQ) has been administered to MCAT registrants since 1977. It was designed to elicit baseline information from students who may or may not apply (or be accepted) to medical school. The PMQ currently includes attitudinal items concerning the changing perceptions of medicine and expanded sections on background and academic information, financial aid needs, and future specialty choices. Schools interested in analyzing these data can use information collected over the last eleven years and can analyze national or institution-specific applicant changes over time and variations by subgroups of applicants.

The Matriculating Student Questionnaire (MSQ) was first administered in 1987 to new entrants to medical school. It provides a second source of information about students before they have been exposed to the medical school curricula. Similar to the PMQ, students are asked their perceptions of medicine. In addition, questions are included on the type of physicians students want to be as well as on their first-year specialty choices. As processing is completed, medical schools are provided with an aggregate summary of their students' responses to the MSQ.

Dr. Tudor is Director, Student Studies, Section for Student and Educational Programs, Association of American Medical Colleges.

Analyses of MSQ data are available on the national group of respondents, an individual school's respondents, or some subset of the population. For example, constituents from a private school could request a report that compared the characteristics of their respondents versus all the MSQ respondents attending private schools. In this way, the school could identify whether its matriculants differed in some way from those students at all other private schools. For example, do the students at my school differ from those at other schools in their perceptions of medicine?

The third questionnaire administered to students is the Graduation Questionnaire (GQ). This questionnaire has been administered since 1978 and provides data on specialty choices and research plans of graduates, as well as their evaluation of the adequacy of medical school instruction. This year, in response to student and specialty board inquiries, the GQ contained items on questions asked of students during the residency interview and on factors affecting the choice of a specialty. Like the MSQ, schools are provided with an aggregate summary of their students' responses to the GQ, as well as anonymous student evaluation of the strengths and weaknesses of the medical school.

Because over seven years of data are available from the Graduation Questionnaire, schools interested in assessing the effects of some change they have made can utilize the information from this questionnaire. For example, suppose a school has made a change in curriculum. By comparing their students' responses for two or more years, the school can assess the degree to which students think such a change is an improvement.

Some of the changes on the national level that have occurred in curriculum are demonstrated in the following data. In 1981,

47.9 percent of the respondents to the GQ believed that research techniques were inadequately covered in their medical education. In 1987, 58.2 percent believed that instruction on research techniques was inadequate. Thus, little progress on the national level was made in this instruction area. However, a lower percentage of respondents in 1987 (60.4 percent) than in 1981 (63.2 percent) thought that instruction on preventive care and medical care cost control was inadequate. Adequacy of instruction in medical care cost control was rated to have improved over the same period: the 65.1 percent of respondents dropped to 60.3 over the six-year period. A similar analysis of changes over time could be undertaken by each institution.

The three questionnaires are monitored closely so that different information is elicited from students at each time period. However, items are also included so that changes in student choices can be assessed. For example, by examining a student's specialty choice on the PMQ, MSQ, and GQ, one can identify changes in specialty choice from before medical school to the first and the fourth year of medical school.

In summary, the PMQ, MSQ, and GQ provide valuable data to each medical school, as well as to the AAMC and national policymakers.

Data from AAMC Operational Files

Richard R. Randlett

The AAMC's Section for Student Services' primary activities are the collecting, processing, and maintaining of applicant, registrant, student, and graduate data, and the disseminating of this information to the AAMC membership. As this information is collected in a personally identifiable manner, it is possible not only to generate statistics in a snapshot manner, that is, for the applicants to a particular entering class, but also in a longitudinal dimension. That is, by linking appropriate files together, one can examine the characteristics of individuals who matriculated at a point in time and follow their progress through medical school to graduation and through their residency years to eventual practice.

Services

Services provided through AAMC's Student Services Section include the following:

1. The Student Information Service is an auxiliary service that responds each year to thousands of general inquiries pertaining to medicine as a career. This is often the Association's first contact with potential applicants.

2. The MCAT Recruiting Release System was initiated in 1986. Through this program MCAT examinees are provided the opportunity to authorize the AAMC to release personally identifiable information including scores to U.S. and Canadian schools of medicine, osteopathy, podiatry, and veterinary medicine for recruitment purposes. Approximately 87 percent of all examinees provide this release.

3. The Medical Minority Applicant Registry is also included as part of the MCAT examination to identify underrepresented minority and economically disadvantaged students wishing to apply to medical school. Mailing labels and computer tapes are provided to U.S. medical schools and certain health-related agencies for use in recruitment efforts.

4. The Comprehensive Medical Student Loan Program (MEDLOANS) Implemented in 1986, enables medical students to apply for the Stafford Student Loan Program (SSLP), Supplemental Loans for Students (SLS), the Health Education Assistance Loan (HEAL), and an Alternative Loan Program (ALP), utilizing one application form. As of June 30, 1988, 4,674 individuals from 94 schools had requested loans totaling over $41 million.

5. The American Medical College Application Service (AMCAS) is an AAMC service in which 107 U.S. medical schools will participate for their 1988 entering class. AMCAS allows an applicant to designate via a single application, the medical schools to which he or she wishes to be considered for admission. In recent years, schools that have joined AMCAS have experienced a 40 to 60 percent increase in their applicant pool including an increase in minority applicants with higher qualifications.

Admission and Other Reports

In addition to providing the application materials to the schools, AAMC also provides related listings and other products to the schools. All U.S. medical schools (regardless of participation in AMCAS) report their admission actions to the AAMC Section for Student Services. The reporting of admission actions to a central source is unique among professional groups and is designed to enable medical schools to know the schools in which accepted applicants are holding places. They can then contact mutually accepted applicants as to their intent to ensure that every available place is filled.

Mr. Randlett is Assistant Vice President for Student Services, Association of American Medical Colleges.

A number of other related reports are provided to schools:

1. Computer Generated Weekly Rosters are available in 13 different sort orders. They allow admission staff to monitor the school's applicant pool and their admission actions. For example, it is possible to ascertain those applicants from a specific undergraduate college, and those applicants that have been accepted.

2. Computer Generated Monthly Summaries are statistical matrices available in 17 different sort orders. They provide aggregate MCAT score and GPA information on both the national and school applicant pools. These are invaluable tools for comparing the applicants and admission actions of one subgroup to another.

3. School and National Acceptance Lists are provided throughout the processing cycle to inform schools as to which of their accepted applicants are holding places in other medical schools.

4. The Joint Acceptance Reports, produced after a class has matriculated, summarizes where accepted applicants finally enrolled.

5. Through the Student Records System, when schools report students matriculating, their enrollment is monitored. Information as to students going on leave of absence, withdrawing, being dismissed/reinstated, transferring between medical schools and the basic reasons are reported by the schools via the Liaison Committee on Medical Education (LCME) Change of Status Reports. It is, therefore, possible to follow a particular entering class and determine their actual attrition. In connection with the Student Records System, the Section also processes the newly implemented Matriculating Student Questionnaire (MSQ) and the Graduation Questionnaire (GQ).

6. National Resident Matching Program (NRMP) follow-up information on residency assignments obtained through the Match augments information from the medical schools whose graduates did not obtain a place through the match.

7. Graduate Medical Education Tracking System, instituted in 1983, annually surveys nearly 800 hospitals as to their current residents and training programs. Changes in individuals' assignments are entered into the file. Hence it is possible to track an individual from graduation to practice.

Summary

Operational files pertaining to students who took the new MCAT in 1977 and/or 1978, applied and were accepted to the 1979 entering class, graduated four years later as members of the 1983 graduating class are still active members of student services files in their fifth year of post-graduate medical education.

Data from AAMC Student and Applicant Information Management System

Charles D. Killian

The Student and Applicant Information Management System (SAIMS) is an integrated set of databases containing information collected from many different sources. It has been operational since 1985 and is updated several times per year with current as well as historical data. SAIMS serves as the Association's repository for data on MCAT examinees, medical school applicants and students, and residents. Among the data sources contained in SAIMS are MCAT scores since 1969 and accompanying responses to the Pre-Medical Questionnaire (PMQ) survey of attitudes, opinions, and aspirations of these examinees; Medical Sciences Knowledge Profile examination (MSKP) scores since 1980; application data on all applicants since 1973, including schools to which they applied and their premedical academic record; Matriculating Student Questionnaire (MSQ) data since 1987; Graduation Questionnaire (GQ) data since 1978; and AAMC/NRMP residency tracking data since 1983.

All files are interlinked to permit complete histories of each individual's contact with the U.S. medical education system. Fourth generation computer languages are utilized to produce custom reports on a wide variety of individual, school, hospital, medical specialty, state, regional, and national-level analyses.

Possible Studies

A nearly infinite number of studies is possible from the rich data contained in SAIMS; some of potential interest to schools are outlined. The complete record of each school's applicants and matriculants since 1973 is available in SAIMS. Previous years' applications and outcomes for these candidates can be summarized side by side with current status. In addition to extracts of a medical school's own applicants, data on those students not offered acceptance or not matriculated can be addressed. Trends in minority applications and school success in matriculating qualified minority students can be analyzed. State residents who did well on the MCAT but did not apply to their own or another state school can be analyzed in terms of their application pattern and matriculation status. Other schools to which accepted applicants are lost in significant numbers can be identified and analysis of those students' academic background, demographic characteristics, and attitudinal data can be conducted. The success of rejected students in gaining admission to another medical school and later graduating can also be ascertained.

Comparisons of applicants' and matriculants' academic and demographic characteristics with those of specified peer schools can be made as long as a sufficient number of schools are identified to ensure confidentiality at the school level. Performance or curriculum-related data collected at the local level can be linked easily to SAIMS and data elements from each SAIMS data source selectively appended to a study file. Academic difficulty or delays in normal progress during medical school and time to graduation can be summarized. Graduates can be tracked into residency programs and the stability and outcomes of their career paths can be evaluated. Specialty choice as juniors in college (from the MCAT-PMQ) through the first year of medical school (MSQ) through graduation (GQ), through actual realized specialty in the residency and fellowship years (AAMC/NRMP tracking) can be traced.

Mr. Killian is Senior Research Associate and Director, Student and Applicant Information Management System (SAIMS), Association of Medical Colleges.

Schools building databases on their own applicants or matriculants can frequently obtain historical data from SAIMS that are otherwise unavailable and can also obtain data from multiple sources linked to form a single study file.

Services to Constituents

SAIMS staff all have advanced training in research design, quantitative methods, and fourth generation computer languages. Their skills run the gamut from data extraction and file creation through sophisticated statistical analysis. Staff are available for initial consultations by phone, but formal requests for data and analysis should be made in writing. Staff will assist with specification and framing of requests and otherwise work with requestors to choose the most appropriate data selected in the most efficient manner. Descriptive brochures and sample reports are available.

Data from SAIMS routinely appear in AAMC publications such as the *Medical School Admission Requirements, Minority Student Opportunities in United States Medical Schools, Trends in Medical School Applicants and Matriculants, and Minority Students in Medical Education: Facts and Figures.* In addition, numerous AAMC special studies utilize data stored in SAIMS including those conducted in cooperation with such agencies and organizations as the National Institutes of Health (such as the Office of Disadvantaged Assistance and Minority Biomedical Research Support Program), congressional offices, The Josiah Macy, Jr. Foundation, The Robert Wood Johnson Foundation, The Howard Hughes Medical Institute, The Commonwealth Fund, and the American Medical Association.

Since data and reports from SAIMS require individualized, custom work, charges to constituents are calculated on a cost recovery basis. Non-constituent requests carry a charge for underwriting the collection, processing, and storage of data. Staff time and computer costs are the two major components of charges. Estimates are drawn up for work and approval secured prior to the institution's incurring charges. SAIMS resources are in high demand and are typically allocated three to four weeks in advance. Therefore, due lead time should be allotted and SAIMS staff should be informed of any relevant project deadlines the requestor must meet. More urgent requests can sometimes be filled; users are encouraged to inquire.

Data from AAMC Institutional Profile System, Faculty Roster, and Hospital Surveys

Paul Jolly, Ph.D.

The Association of American Medical Colleges maintains, analyzes, and reports data concerning student, applicant, and faculty populations in medical schools and hospitals, as well as data on the institutions themselves. There are four major data bases: the Institutional Profile System (IPS), the Faculty Roster System (FRS), the Student and Applicant Information Management System (SAIMS), and the Hospital Data Base, as well as a number of smaller, special purpose systems. Either separately or in combination, these data bases can be useful tools for institutions and individuals concerned with medical school admissions who are analyzing trends and assessing admissions policies. Since SAIMS is described in another paper, it will not be discussed at length here; this presentation will focus on characteristics and sample usages of the other three systems. Modeling activities undertaken in support of the Task Force on Physician Supply, which makes use of these data, will also be reviewed briefly.

Institutional Profile System

The Institutional Profile System (IPS), a computer-based data system maintained by the AAMC, contains information on revenues and expenditures, faculty counts, curricula, student enrollment, and student financial aid of 127 member U.S. medical schools. For instance, the system can provide data showing numbers and types of students, faculty population by rank and department, residents by discipline, student loans and scholarships by source, revenues by source, and expenditures by object. Data are available for all years since 1961-62; currently, the system requires 94 million bytes for data storage. These data are gathered annually from various AAMC questionnaires and the Liaison Committee on Medical Education (LCME) questionnaire, which is divided into several sections: Part IA (Financial), Part IB (Student Aid), Part IC (Capital Expenditure), and LCME II (Other).

IPS is used to produce an annual ranking report for each school, showing how that school stands in a national context of student, faculty, and financial variables. Also produced annually for each school and for the Liaison Committee on Medical Education is a longitudinal report showing trends on a variety of variables of interest. In addition, the system is frequently used by AAMC staff for various internal and contractual research projects. Data from the Institutional Profile System are also available upon request to the AAMC staff and to the AAMC constituency. The information is selected from approximately 34,000 data items, or variables, contained in IPS for each medical school. These data can then be compiled into special ranking reports or summary tables for any specified subset of medical schools.

Faculty Roster System

The Faculty Roster System (FRS), initiated in 1966, is a computer-based data system containing information on the current appointments, employment histories, training, credentials, current activities in teaching, research, patient care, and administration and demographic characteristics of full-time U.S. medical school faculty. Demographic information available through the system includes the age, rank, sex, degree(s), specialty or discipline, and ethnic self-description of faculty members. In addition to supporting AAMC faculty manpower studies, the system provides information to medical schools for their use in responding to

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other organizations' data requests, for identifying alumni on the faculties of other schools, and for producing special reports.

A frequently used part of the Faculty Roster database is the index of women and minority faculty, which assists schools and government agencies in their affirmative action recruiting efforts. Between August 1, 1986 and August 1, 1987, Faculty Roster staff responded to 233 recruitment requests from medical schools, providing names and addresses of faculty members meeting the requirements specified by search committees. Only the records of individuals consenting to the release of their information are used for this purpose.

As of June, 1987, the Faculty Roster database contained records for 57,947 full-time salaried faculty and 66,408 individuals who previously held faculty appointments. The system requires 126 million bytes of disk storage.

Hospital Data Base

The Division of Clinical Services at AAMC maintains a data base on hospitals, including not only the 450 members of the Association's Council of Teaching Hospitals, but also other teaching hospitals and non-teaching hospitals. The total number of hospitals in the data base is currently 5,872 and requires 45 million bytes of disk storage on-site in addition to off-site storage. Data are derived from the annual surveys of the American Hospital Association and from periodic surveys conducted by the AAMC, including the Directory questionnaire and the House Staff Stipends Survey. Information includes size, sources of funding, house staff stipends and benefits, residents on duty, teaching role, utilization statistics, and tertiary care services available.

Modeling Activities

In support of the work of its Task Force on Physician Supply, the Association is carrying out a series of modeling activities relating demographic, educational, practice, and policy variables. The purpose of these activities is to inform the AAMC constituency and to illuminate policy discussions of the Task Force.

The scope of the modeling effort is divided into five stages of physician career development, as follows:

1. Modeling the applicant pool;
2. Modeling the acceptance and matriculation process, projecting new first-year students;
3. Modeling progress through medical school, projecting dropouts and graduates;
4. Modeling residency and fellowship training, projecting new practitioners; and
5. Modeling immigration, retirement, and death, projecting aggregate numbers of physicians.

Of particular relevance to the consideration of the declining applicant pool is the stage two model, which simulates the application and admission process.

Data will be used from the Student and Applicant Information Management System database to derive a model for the acceptance process for each school, as well as a competitive choice model for applicants with multiple acceptances. The goal is to project for each school what the applicant pool and entering class will be like in future years, based on projected national and regional changes in the applicant pool.

PART 3

Using Institutional Data In Admissions

Factors Related to Black Student Success in Medical School 43
Larry A. Sachs, Ph.D., and Leibert W. Morris
Comprehensive Student Database as a Resource to the Admissions Committee 49
George Nowacek, Ph.D.

Factors Related to Black Student Success in Medical School

Larry A. Sachs, Ph.D., and Leibert W. Morris

Introduction and Purpose

Blacks, Hispanics, and Native Americans have been and continue to be underrepresented in the health professions. Programs were initiated over the past two decades to enlarge the percentage of minorities in the health professions. Many efforts were motivated by a desire to improve access to health care of underserved minority populations (1). Although minority health professionals should and do provide health care to all segments of society, there is a greater likelihood that a health professional establishing a practice in a minority urban ghetto or a minority rural area will be of minority background. Some sources (2) feel that the momentum gained from these programs may be lost and the competition from other professional schools for talented minorities has increased. Thus it remains critical to recruit, select, admit, retain, and graduate minority members for health professions education. This study identifies factors related to black student success at a large medical school across eleven years following the initiation of minority recruitment efforts.

Review of Literature

The literature is replete with studies investigating the relationship of prior academic achievement and/or aptitude with success in college. A subset of these studies has included professional schools and some have looked at subgroups of students, particularly minorities. Collectively, the studies show that previous grades, class rank, and test scores do predict college success as measured by grade-point average.

A quarter of a century ago, Anastasi, Meade, and Schneiders published one of the first studies demonstrating that preadmissions variables other than academic achievement were related to college success (3). Korman, Stubblefield, and Martin reported an early study of a broad spectrum of variables to identify patterns of success in medical school (4). Studies for subgroups of minority students are more difficult to design because of the smaller sample sizes. Two studies investigated the role of personal qualities in predicting several measures of college success for different racial groups. Tracey and Sedlacek found that positive self-concept, realistic self-appraisal, availability of a strong support person, and demonstrated community service predicted "persistence" or continuing enrollment in school for blacks (5). After accounting for high school class rank and SAT scores, Willingham found that across nine colleges the minority dropout rate was 76 percent higher than expected (6). Follow through in extra-curricular activities and school recommendations did add to his predictions of success.

Minority student success and difficulty in medical school have been previously investigated (7-11). Collectively these studies demonstrate that, while traditional cognitive variables do correlate with various measures of success, they do not give the complete picture for minority students. Thus, a broad spectrum of variables should be considered in planning future studies.

Dr. Sachs is Assistant Director and Coordinator for Research and Evaluation and Mr. Morris is Associate to the Dean, Ohio State University College of Medicine. *An earlier version of this paper was presented at the American Educational Research Association Annual Meeting, New Orleans, Louisiana, April 7, 1988.*

Methodology

In 1971 the Ohio State University College of Medicine initiated a minority recruitment program and in succeeding years implemented retention and student support efforts. Several times informal assessments of limited aspects of these programs were made. With the cumulative numbers of minority students admitted since 1972, it is now possible to carry out a comprehensive evaluation of the success of the College's affirmative action policies. Thus, entering class data for years 1972 through 1982 were inspected to identify minority students. Entering 1982 students would be expected to graduate in 1986 or 1987 and thus would be the last class with complete outcome data. No Native Americans and only a few Hispanic Americans were part of these classes. Therefore, the final study group consisted of 113 black medical students. A comparison group of 113 non-minority students was chosen to match on entry year, gender, and (as close as possible) on MCAT scores and undergraduate grade-point average.

A list of potential study variables was constructed based on experience and a literature review. Due to the retrospective nature of the study, only variables known to be available through existing data bases were retained. These data sources consisted of individual student files, the American Medical College Application Service, the Office of Financial Aid reports, and a College of Medicine entering resources inventory. A draft data collection form was prepared and tried on the data from five students. Minor changes were made to arrive at the final form. For organizational purposes, the variables are clustered under the seven headings of personal, past family history, academic characteristics, academic aptitude/achievement, activities, support at entry, and support during medical school.

Personal variables were gender, age, marital status, spousal activity, number of children, health status, family concerns, financial concerns, and personal recommendations. Nine past family history variables were number of siblings, sibling order, father/mother part of family unit, father/mother education, father/mother occupation, and hometown. Thirteen academic characteristics were high school/undergraduate honors programs, three features of undergraduate school, previous coursework (anatomy, biochemistry, microbiology, pathology, pharmacology, physiology), pre-entry program, and other enrichment program. Aptitude/achievement measures were reading and test-taking skills, old MCAT or New MCAT scores, undergraduate GPA and science GPA, and graduate school. Activity variables were campus, community, and religious involvement, and college work experiences. Six sources of social support (both at entry and during medical school) were parents, spouse, friends, students, faculty, and physicians.

A data collection form was completed for each of the 226 study subjects. Every attempt was made to reconcile conflicting data from the several sources in the few cases where conflicts occurred. Also, missing data were kept to a minimum (< 0.7%) by utilization of secondary data sources where necessary. Once compiled from the various sources, the data were coded and entered into a computerized data base.

An operational definition of "success" was needed. Grade-point averages do not exist in the College of Medicine and licensure test scores were thought to be too restrictive. Two definitions of success were used as outcome variables in this study: graduated (yes or no) and graduated on time (yes or no). On time was considered to be in less than 3 1/2 years for the 1972-1979 classes that entered the three-year curriculum and less than 4 1/2 years for the 1980-1982 classes with the return to the four-year calendar.

The first phase of the data analyses was a generation of frequencies, primarily to check for data coding and entry errors. Following correction of errors, descriptive profiles were generated for both the minority group and the comparison group. Differences between the two groups were identified. Univariate relationships of each predictor variable with

the two success variables were calculated for the two groups. Finally, stepwise logistic regression equations were calculated to determine the combined effects of several predictor variables simultaneously on the outcome (success) variables. Logistic regression was chosen because of the dichotomous nature of the outcome variable.

Results

The minority and comparison groups differed on one third of the personal variables with the minority students having more children, more family concerns, and more financial concerns. The two groups differed on five of the nine past family history variables. The parents of the comparison group had more years of education, their fathers' occupation was more often professional status, and their mothers' occupation was more often homemaker. The black students' hometown environment was predominantly large urban. The black students averaged lower on all of the academic aptitude/achievement variables even though the comparison group had been chosen to be as similar as possible on MCAT scores and GPA.

Graduation rates were calculated for both study groups. The black graduation rate of 82% was significantly lower ($X^2 = 12.39$, df = 1, $p < .001$) than the 97% graduation rate in the comparison group. On-time graduation was the second success variable calculated for each group. The on-time rate of 42% for blacks was significantly lower ($X^2 = 29.57$, df = 1, $p < .0001$) than the 80% rate of the comparison group.

Four academic variables, one activity variable, and one support variable showed significant univariate relationships with the graduation variable for the minority group. The graduates had significantly higher old MCAT science, New MCAT chemistry, and New MCAT reading scores than the non-graduates. More of the non-graduates had previously taken an anatomy course. The two variables that differentiated most between these two subgroups of minority students were community involvement and parents' support during medical school. Coding of these data required some subjectivity after a thorough review of the student's file. It is hard to imagine any systematic bias that would account for the significant findings related to these two variables. Nevertheless, some caution is advised in interpreting these results.

Community involvement and parents' support were also the two variables that entered the stepwise logistic regression for minority graduation. Table 1 summarizes the results in terms of graduation probabilities and actual frequencies for each of the six combinations. The corresponding graduation analysis was not performed for the comparison group due to the fact that only three did not graduate.

For those that graduated, predictors for "graduation on time" were investigated. In the minority group, eight variables showed significant univariate relationships. Those black students graduating on time were more likely to have attended a public-supported undergraduate institution and to have better reading and test-taking skills. The on-time group scored higher on old MCAT science and the New MCAT areas of biology, chemistry, science problems, and quantitative skills. Using an equation that had been previously generated from a national sample, New MCAT scores were used to estimate ($R > .9$) the old MCAT science scores for the more recent students. This allowed this one MCAT science score to be used for the total sample.

For the stepwise logistic regression, MCAT science and test-taking skills were the two variables that entered the equation. Since MCAT science is a continuous variable, an exponential equation is necessary to fully describe the results. By grouping MCAT science scores into four ranges, we present a table of "on-time" probabilities for the eight combinations.

Using the exponential equation the following cutoffs were determined. For a student to have greater than a .5 probability of graduating on time, he or she should have an MCAT science score above 550 or an MCAT science score above 470 combined with average or above test-taking skills.

TABLE 1

Black Student Graduation Probabilities

Community Involvement	Parents' Support	Graduation Probability	Actual Frequencies Graduated	Not Graduated
High	Yes	.974	25	1
High	No	.877	24	3
Average	Yes	.978	8	0
Average	No	.893	15	2
Low	Yes	.855	7	1
Low	No	.524	14	13

TABLE 2

Black Student On-Time Graduation Probabilities

MCAT Science Score Range	Test-Taking Skills	On-Time Probability*	Actual Frequencies On-Time	Late
350	Low	.075	0	4
350	Average or above	.196	1	1
350 and 450	Low	.157	4	20
350 and 450	Average or above	.360	3	4
450 and 550	Low	.302	4	8
450 and 550	Average or above	.565	15	16
550	Low	.499	0	0
550	Average or above	.750	12	1

*Probabilities are calculated using 300, 400, 500, and 600 respectively.

TABLE 3

Expected Graduation Status for Additional Students

Community Involvement	Parents' Support	Graduation Probability	Graduated On-Time	Late	Not Graduated
High	Yes	.974	1	0	0
High	No	.877	3	2	0
Average	Yes	.978	5	0	0
Average	No	.893	4	2	2
Low	Yes	.855	0	0	0
Low	No	.524	0	1	2

A similar analysis was performed to identify predictor variables for on-time graduation in the comparison group. Only three univariate results were significant; this is what would be expected by chance. The on-time group was younger and scored higher on New MCAT physics, but lower on old MCAT verbal. Only the age variable entered the logistic regression equation and it was not a good fit. Thus the conclusion was made that these variables do not differentiate well between graduation on time and late within the comparison group.

Discussion

The black graduation rate of 82 percent is lower than reported national data (2) and that of some other schools (12). Part of this difference may be related to the three-year curriculum calendar under which the 1972-1979 entering classes were operating. For the 1980-1982 classes studied that were enrolled in the more typical four-year curriculum, the graduation rate approached 90 percent and the on-time rate exceeded 60 percent.

Two non-academic variables--community involvement and parental support during medical school--jointly predict black graduation well. For those black students who graduate, two academic variables predict graduation on time rather well. The results are not replicated in the comparison group. There were only three non-graduates in the comparison group, thus rendering any further analysis useless. And for the graduation on-time variable in the comparison group, no meaningful set of predictors emerged.

As a first attempt at validating these preliminary findings, data were collected from the black students in the 1983-1985 entering classes. While not part of the study sample, these classes had been admitted prior to the conduct of this study. Table 3 shows their expected graduation status relative to community involvement and parents' support. The numbers are small but the graduation rate of 82 percent and the on-time rate of 72 percent are similar to the study rates above. The students rated low in community involvement continue to have graduation difficulties.

A prospective study was initiated with the 1987 entering class. It will continue to validate the previous study as well as assess any changes in student selection characteristics related to the variables identified in this study.

In summary, it seems that some measure of parental or family support and some record of sustained involvement in non-academic activities are strong predictors of black student graduation from medical school. This relates to findings (13-14) that supportive interpersonal relationships are both desirable and necessary for development of black students during the college years at predominately white colleges and universities. Traditional academic achievement/aptitude variables were absent from the graduation prediction but were important in the graduation on-time prediction. For black students who do graduate, average or above MCAT scores and test-taking skills predict that they will be more likely to graduate on time.

Conclusion and Implications

Selection for admissions to medical school imposes a high degree of responsibility on the college's admissions committee. It is the traditional authority of medical school faculty to select who will be admitted to the study of medicine. This prerogative allows medical schools to admit men and women who, in the faculty's opinion, have the academic and personal qualities requisite for a career in the medical profession. It is important for colleges of medicine to examine from within, by careful review of predictive data, the success of students from non-traditional backgrounds. Thus, the institution can continually develop affirmative approaches to increase the number of students from underrepresented minority backgrounds.

This study will assist admissions committees in evaluating predictive factors related to minority student applicants. It allows for building upon past successes as well as developing new approaches to increasing the number of minority matriculants who will graduate from medical school.

References

1. KEITH, S., BELL, R., SWANSON, A., and WILLIAMS, A. Effects of Affirmative Action in Medical Schools. *N. Engl. J. Med.*, 313:1519-1525, 1985.

2. WEISFELD, V. (Ed.). Special Report, Number One. Princeton, New Jersey: The Robert Wood Johnson Foundation, 1987.

3. ANASTASI, A., MEADE, M., and SCHNEIDERS, A. *The Validation of a Biographical Inventory as a Predictor of College Success*. New York: College Entrance Examination Board, 1960.

4. KORMAN, M., STUBBLEFIELD, R., and MARTIN, L. Patterns of Success in Medical School and Their Correlates. *J. Med. Educ.*, 43:405-411, 1968.

5. TRACEY, T., and SEDLACEK, W. Non-Cognitive Variables in Predicting Academic Success by Race. Paper Presented at American Educational Research Association Annual Meeting, New York, March 1982.

6. WILLINGHAM, W. *Success in College: The Role of Personal Qualities and Academic Ability.* New York: College Entrance Examination Board, 1985.

7. DRESDEN, J., COLLINGS, F., and ROESSLER, R. Cognitive and Non-Cognitive Characteristics of Minority Medical School Applicants. *J. Natl. Med. Assoc.*, 67:321-323, 1975.

8. EVANS, D., JONES, P., WORTMAN, R., and JACKSON, E. Traditional Criteria as Predictors of Minority Student Success in Medical Schools. *J. Med. Educ.*, 50:934-939, 1975.

9. JOHNSON, H., and ROSEVEAR, G. Traditional Admissions Variables as Predictors of Minortity Students' Performance in Medical School--A Cause for Concern. *J. Natl. Med. Assoc.*, 69:551-554, 1977.

10. STRAYHORN, G. Perceived Stress and Social Supports of Black and White Medical Students. *J. Med. Educ.*, 55:618-620, 1980.

11. RAMOS, S., CROEN, L., and HADDOW, S. Predictors of Preclinical and Clinical Performance of Minority Medical Students. *J. Natl. Med. Assoc.*, 78:601-607, 1986.

12. PAYNE, J., NOWACKI, C., GIROTTI, J., TOWNSEL, J., PLAGGE, J., and BECKHAM, T. Increasing the Graduation Rates of Minority Medical Students. *J. Med. Educ.*, 61:353-358, 1986.

13. FLEMING J. *Blacks in College*. San Francisco: Jossey-Bass, 1984.

14. LOEVINGER, J. *Ego Development: Conceptions and Theories*. San Francisco: Jossey-Bass, 1976.

Comprehensive Student Database as a Resource to the Admissions Committee

George Nowacek, Ph.D.

Introduction

The University of Virginia Admissions Committee was invited to participate in the AAMC Interpretive Studies Research Program in 1980. While the initial purpose of the program was to begin research on the New MCAT, it became evident that the participating schools would experience first-hand the benefits of having student information available in an electronic data base format for analysis. During the next two years, we provided detailed student data and specific research questions to the program staff and received back data printouts and the results of the analyses.

The participation in the Interpretive Data Study encouraged us to consider developing our own comprehensive student data base. The initial request to the Dean to provide continuing support for the data base was met with questions regarding the immediate problems that the data base could address. Our experiences with the Interpretive Data Study were used to show how important questions could be addressed in a timely and cost-efficient manner because of the existence of the data base; that without this resource, it would be difficult, if not impossible to provide timely responses to important admissions questions. These examples were instrumental in the Dean's final approval of establishing the data base and funding the data base manager position. The development of the data base took about a year and was based on clearly identified expected use of being responsive to the administrative needs of reporting medical student information and providing answers to research questions raised by admissions or medical education in general.

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Developing Organizational Resources

The focus of this paper will be on the use of comprehensive student data base by the Admissions Committee. A basic premise is that the medical school needs to commit organizational funds to develop resources for which there are no immediate needs or problems identified. Two examples will be presented showing how the student data base was able to provide answers to questions raised by the Admissions Committee, answers that would have been impossible to provide on a timely basis without the data base. The first example is whether a select group of medical students who graduated from a special undergraduate program were doing as well in medical school as the other students from traditional undergraduate programs. The second example is a question that arose specifically related to the declining applicant pool. The question was asked, "What effect would a change in the initial screening criteria have on future grade distribution?"

In the first example, the University of Virginia undergraduate school has a scholars program. A major feature of this program is that the students are not required to declare a major and can select whatever course offerings might be of interest to them. Because the medical school accepts many University of Virginia graduates it was suggested to the admissions committee that maybe these scholars were having more problems with the medical curriculum because coming from a very unstructured and flexible program to a highly structured and preset program such as the medical curriculum would be difficult for students from the scholars program. The data elements selected from the data base included resident status, (Virginia or non-Virginia), special student code (whether they were scholars or in some other special program) and grades in basic

sciences, clerkships, and National Board Part I scores. All students were then classified as to whether they participated in scholars programs, whether they came from the University of Virginia, or whether they graduated from a school other than Virginia. The results of the analysis are shown in Table 1.

The mean score for the National Board Part I, and average grades in anatomy and medicine clerkships are shown for the three groups. For all the means, the students' MCAT scores were partialed out to remove the effect of different ability levels. While the mean score for the National Board and the average anatomy grades were slightly lower for the scholars group, the F-test of significance between the means shows no real differences between the three groups. Based on these results, it was concluded that the scholars from the University of Virginia undergraduate program were experiencing no more difficulty than were any other students. These results set aside concerns that these students might need to be reviewed differently.

The second example is the direct result of the declining applicant pool. The question was raised that there might be a low MCAT score or an undergraduate grade-point average (GPA) below which most medical students were receiving non-passing grades in basic sciences or clerkships. Viewed differently, if a particular MCAT score or an undergraduate GPA could be identified below which many non-passing grades were occurring, the initial screening criteria might be adjusted without risk of experiencing a significant shift in the distribution of student grades. The data elements selected from the data base included resident Virginia status, MCAT scores, grades in basic sciences courses, and grades in clerkships. All grades were recorded as non-passing or passing.

The results of the analysis are shown in Tables 2 and 3. Table 2 shows the number and percentage of students receiving non-passing grades in basic sciences at each of the MCAT scores for the Biology, Chemistry, and Physics scales. The percent figure in each cell is the percent of students at that MCAT score who received one or more non-passing basic science grades. There are two observations to make about data on this table. The first is that while students with lower MCATs do get more low grades, there is not an obvious point below which the problem becomes acute. The second observation is that even students with high MCATs get non-passing grades. While the percentages of students receiving non-passing grades at the upper MCAT scores is low, the MCAT score by itself cannot be used to predict who will not do well.

Table 3 shows the number and percent of students receiving non-passing grades in basic sciences courses broken down by Virginia resident or non-resident and by percentile of undergraduate Biology, Chemistry, Physics, and Math GPA. The same effect is observed as with the MCAT scores even more prominently, with the students with low grades being distributed across all grade-point average levels. Again, in each cell, the number represents the number of students at that percentile interval who received below passing grades and the percent is the percent of all students in that particular cell.

The analysis of these data stopped at this point because the basic question was answered. There was not a need to change the basic screening procedures and that decisions related to the MCATs or undergraduate Biology, Chemistry, Physics, and Math GPA include a review of all pertinent information.

Conclusion

An outcome of the Interpretive Studies Program was the suggestion that while the Association could provide some data analysis support to medical schools, each school should consider developing a data base of information unique to that school. The UVA experience has shown that the suggestion was sound and the recent problems associated with the declining applicant pool have underscored the necessity for having quick access to student information.

TABLE 1

Mean Scores and Grades for Scholars, Virginia Graduates, and Non-Virginia Graduates for NBME-I, Anatomy Grades, and Medicine Clerkship Grades

	UVA Scholars	Other UVA	Other Non-UVA	F	p
NBME I Total	509	527	540	1.05	.356
Anatomy Grades*	7.2	7.8	8.2	1.63	.198
Medicine Grades*	9.7	9.6	9.6	.68	.517

* A+ = 13, A = 12, ..., D- = 2, F = 1

In my view, the development of the AAMC Student and Applicant Information Management System (SAIMS) data base does not invalidate this need to develop a local data base. Each school should develop a data base that complements the information that the SAIMS data base can provide. Comprehensive student data bases require continual updating to eliminate overlap with other data bases.

The basic premise of this paper has been the need for a medical school to commit funds to develop a resource for which there is no obvious need at the time it is developed. The resource of a comprehensive electronic student data base is one of those institutional resources that has shown to be very useful to UVA's Admissions Committee in providing timely answers to important questions, questions that could in part be raised only because of the existence of the data base.

TABLE 2

Students with One or More
Non-Passing Basic Science Grades
by MCAT Scores on 3 MCAT Scales
Virginia Residents Only (N = 580)

MCAT Scale		MCAT Score 5	6	7	8	9	10	11	12	13	14
Biology	N	1	1	6	15	11	15	9	4	0	0
	%	33	11	23	17	9	11	7	7	-	-
Chemistry	N	1	3	5	13	14	9	12	3	0	2
	%	25	20	18	18	12	9	10	4	-	29
Physics	N	1	1	7	13	13	9	10	2	5	1
	%	33	9	19	16	11	9	11	3	14	7

TABLE 3

Students With One or More
Non-Passing Basic Science Grades
by Percentile of Undergraduate BCPM GPA

		BCPM GPA Percentile 0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Virginia Residents	N	11	8	11	11	10	5	5	3	2	4
	%	19	13	18	15	15	8	7	5	3	7
Non-Virginia Residents	N	8	6	2	1	1	1	0	1	1	0
	%	50	29	13	5	7	20	-	5	2	-

PART 4

Improving the Admissions Process

Increasing the Effectiveness of the Selection Interview 55
John B. Molidor, Ph.D.
Using MCAT Data in Admissions 61
Karen J. Mitchell, Ph.D.
Selecting Nontraditional Applicants Using the Simulated Minority Admissions Exercise 63
William E. Sedlacek, Ph.D., and Dario O. Prieto
Assessing the Admissions Process in an Era of a Declining Applicant Pool 65
Karen J. Mitchell, Ph.D.
Combining Academic Qualifications to Assess Fill Rates and Graduation Rates 69
Wendy L. Luke

Increasing the Effectivenss of the Selection Interview

John B. Molidor, Ph.D.

Introduction

All medical schools desire to select individuals who will best fit within their institutions. The faculty of the medical schools are extremely interested in choosing those applicants whose backgrounds, credentials, goals, and values match up with their own institutional cultures and personas. Selecting those individuals, however, has become an increasingly arduous task, especially in light of a declining applicant pool. As fewer and fewer applicants apply to medical schools, admissions committees are reexamining their selection criteria and procedures. Medical schools are seeking newer and more creative means to recruit and select candidates within a rapidly changing and competitive environment.

An integral component of most medical schools' admissions procedures is the selection interview. A typical admissions procedure employs multiple screenings prior to the interview. The focus of these early evaluations usually is on the academic and cognitive aspects of a candidate's background. For example, applications are usually prescreened to ensure that each candidate meets minimum academic levels of performance such as grade-point averages and MCAT scores. Those individuals passing this preliminary screen are asked to submit supplementary materials such as autobiographical statements, essays, and letters of recommendation. Additional evaluations performed on this new information lead to the decision of whom to invite for an interview.

The interview itself allows for a face-to-face encounter with an applicant. Information that might be difficult or impossible to obtain by any other means is now feasible and can be gathered in a practical manner. At most medical schools, the focus of the interview tends to be on the noncognitive aspects of a candidate's background.

The usefulness of the interview as a data source, as currently employed by most medical schools, however, is questionable. Much of the research on the selection interview, especially the earlier studies, is not particularly encouraging. These investigators found that the interview was not a very reliable procedure and that it surely lacked validity (1,2). Nevertheless, the popularity and acceptability of the interview to both faculty and applicants do not seem to have been diminished appreciably by these findings.

A few encouraging findings, however, did emerge from these early research studies. The most promising area dealt with the use of a structured interview (1-4). The most recent research on the selection interview is even more encouraging (5-7). These investigators, through the use of statistical analyses (that is meta-analyses), have found that the structured interview is, indeed, a reliable and valid selection device.

Given that the interview will continue to play an integral and critical role in the selection and recruitment of medical students, it becomes extremely important that admissions committees look at ways in which to improve the effectiveness of the interview as a selection device. The intent of this paper is to review briefly the different purposes, formats, and types of interviews and then to present five recommendations for improving the effectiveness of the interview as a selection device.

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Purposes of the Interview

The word interview is derived from the French word entrevue (entrevoir), meaning "to see one another" or "to meet" (8). A more general definition for medical schools would include any encounter between at least two people when the understood purpose is for one of the individuals to make an evaluation of the other, for any reason. The selection interview as presently used by most medical schools typically serves one or more of the following four major purposes: (a) to gather information about an applicant; (b) to evaluate this information in order to reach a final decision about an applicant; (c) to verify information that is presented through other means; or (d) to recruit applicants to the institution.

As mentioned earlier, the interview allows an opportunity to gather information about an applicant that might be difficult or impossible to obtain by any other means. Information such as interpersonal relations and career motivations are well suited for an interview; grade-point averages and MCAT scores are not, because academic measures are typically available through more easily accessible and reliable means such as college transcripts, application and/or testing services. The interview allows one to elicit information from an applicant that is not available from any other source. This information is usually of a noncognitive nature.

A second purpose of the interview is that the interview provides an interviewer with information that is crucial in evaluating the applicant's potential for medical school. The interviewer's task is to evaluate the information that he or she has obtained and then to transform this information into both quantitative ratings and qualitative comments that will assist the admissions committee in reaching a final decision about an applicant. If handled well, this will determine how successful a school's interviewing process is.

Another purpose of the interview, although to a smaller extent, is verification. Some medical schools use part of the interview to ensure that information presented on the primary and secondary application materials is accurate. Concerns regarding the authorship of these materials, the level of involvement of extracurricular activities, and the like may be addressed and explored in greater detail through the interview.

A final purpose of the interview is recruitment. Given the competitive environment of the current admissions scene, many schools are turning to the interview as a recruiting tool. An interview in which time and attention are given to the applicant and the candidate is treated with dignity and respect, reflects favorably upon the medical school. The reverse situation reflects poorly on the school. An interview that is handled well serves not only as a learning experience but also as an opportunity to showcase what the medical school has to offer.

Format of the Interview

Most medical school interviews can be described by one of the following three formats: structured, semi-structured, and unstructured.

The structured interview follows a pattern or an outline. Specific questions are usually asked within a set time frame. Five criteria for a structured interview have been described (9-10):

1. An analysis must be performed based upon the knowledge, skills, abilities, and other requirements the applicant needs to do a job or task. In other words, the requirements the applicant needs to succeed must be articulated in a job analysis.
2. Questions the applicants are asked are based on the job analysis.
3. The same questions are asked of each applicant.
4. Sample answers and scoring systems are provided for each question.
5. A board or panel of interviewers ask the questions.

A semi-structured interview would involve some, but not all of the five criteria of a structured interview. For example, at one

school a panel of interviewers may be used, but the same questions would not be asked of all candidates. Another school might have a set of categories but no sample answers for the questions asked within each category. There is some structure present, but it is not at the same level as the structured interview. Most medical school interviews would probably be designated as semistructured.

An unstructured interview is one in which the applicant is free to talk about whatever he or she wants. There is no pattern, outline, or set procedure in an unstructured interview situation. Questions are broad and diffuse. Both the interviewer and interviewee are free to discuss whatever arises. As a rule no time limit is set, no job categories are to be assessed, and no evaluation form is to be completed. The interviewee, as opposed to the interviewer, has control of the interview.

Types of Interview

Admissions committees also vary greatly as to the number of interviewers involved throughout the selection process. For use of reference, these differences may be categorized according to one of four processes: (a) one-on-one, (b) group, (c) board/panel, or (d) combined.

In a one-on-one interview, there is one interviewer and one interviewee. This kind of interview is the most prevalent within medical schools.

In a group interview, there is one interviewer and many interviewees. The group interview was devised to select officer candidates for the Armed Forces (8). Normally, a group would be gathered and assigned a task to solve or accomplish as a group. The group would then be observed to see if an individual would emerge as the leader.

Another type of interview is the board/panel interview. This is one where there are many interviewers and one interviewee. The most common example of this kind of interview, within an academic setting, is the dissertation/doctoral committee. Within industry, it is probably when an organization selects a president or high-level executive.

The last type of interview is a process in which one would utilize a tiered or combined system. For example, an institution might use a group interview, followed by a board/panel interview. Most medical schools do not use a tiered or combined process with their interviews.

Recommendations

Given the tremendous variability and variety with which medical schools utilize the selection interview, the current research on the interview, as well as institutional experiences, provide useful recommendations for schools wishing to increase the effectiveness of their interview procedures. These recommendations may be summarized as follows:

1. Determine the purpose of the interview. Committees need first to determine just what the purpose of their interview is. If recruitment is the primary purpose, then the interview should be designed appropriately to achieve or to maximize this goal. If, on the other hand, the committee wants to gather interpersonal information, then the interview will take on an entirely different feel and structure. Schools need to decide, prior to the start of their admissions cycle, just what they desire to accomplish with their selection interview. This basic, but simple, step determines the texture of each of the following recommendations.

2. Add structure to the interview. As structure increases, so does the reliability and validity of the interview (10,11). One can add structure through a variety of means. One way is to do a performance analysis. This entails a study of the skills, traits, and abilities needed for successful completion of one's medical school program. From these traits and skills, the admissions committee can identify categories they would like to assess in the interview. Each category should be defined operationally. Questions should be generated for each category. Responses for these questions are then reviewed and discussed by committee members to determine

what constitutes poor, average, and superior answers. Interviewers are trained to ask the same questions of each applicant. One additional benefit of structuring the interview is that it allows the medical school to implement operationally its goals and values within the selection process.

3. Increase the number of interviewers. The most recent studies indicate that a board/panel interview helps to reduce individual interviewer bias (10). In doing so, reliability is increased. The validity of structured individual interviews and board/panel interviews is about equally high (7). In a board/panel interview situation, more than one interviewer hears an applicant's response to the same interview question. In the board/panel process from two to five members can be used; most typically employ three interviewers.

4. Quantitatively evaluate each applicant. Once information is gathered, the interviewer needs to evaluate quantitatively the applicant's responses. Each category should be given a score or evaluation. In this way, an overall or total assessment can be determined. This also allows one to calibrate each interviewer. The so-called "easy" and "tough" interviewers can be identified and, if necessary, their ratings can be adjusted to reflect their rating tendency. Interviewers who consistently recommend applicants who become successful medical students may be identified and studied. Statistics may be generated for each of the interviewers for institutional validity studies.

5. Train each interviewer. Interviewers are strongly affected by rater errors or biases common to the interview situation. These biases arise from a variety of sources. The most common rating biases include the halo effect, initial impression, control tendency, contrast effects, and leniency. Interviewers need to be aware of each of these rating errors and to take steps in reducing or eliminating these biases. The most effective way to reduce these errors is through a careful training program.

Conclusion

Few medical schools are willing to select applicants sight unseen. There is something real and tangible about having applicants seated in front of interviewers as they look, listen, and evaluate them in person. To improve these evaluations, however, medical schools need to look at their interview selection procedures and policies.

Although the earliest research on the interview was somewhat pessimistic regarding its reliability and validity, newer studies indicate that the interview can be a very versatile and effective selection device. The focus of these newer studies is on the structured interview. What is most encouraging about these studies is that adding structure to an institution's existing interview process increases reliability and validity.

Medical schools are finding themselves in an increasingly competitive environment often with a concurrent concern of a reduction in funding. A major advantage of these five recommendations is that they do not require a tremendous increase of dollars or resources in order to improve the effectiveness of the interview. Many of these recommendations can be implemented utilizing existing resources. By implementing these recommendations, medical schools have the opportunity to increase their chances of selecting those individuals who can best function at their institutions.

References

1. MAYFIELD, E. C. The Selection Interview: A Reevaluation of Published Research. *Personnel Psychology*, 17:239-260, 1964.

2. ULRICH, L, and TRUMBO, D. The Selection Interview Since 1949. *Psychological Bulletin*, 63:100-116, 1965.

3. WAGNER, R. The Employment Interview: A Critical Summary. *Personnel Psychology*, 2:17-46, 1949.

4. SCHMITT, N. Social and Situational Determinants of Interview Decisions: Implications for the Employment Interview. *Personnel Psychology*, 29:79-101, 1976.

5. WRIGHT, P. M., LICHTENFELS, P. A., and PURSELL, E. D. The Structured Interview: Additional Studies and a Meta-Analysis. *Journal of Vocational Behavior.* (In Press).

6. McDANIEL, M. A., et al. The Validity of Employment Interview: A Review and Meta-Analysis. Personal Communication, 1987.

7. CRONSHAW, S. F., and WIESNER, W. M. The Validity of the Employment Interview. In G. R. Ferris and R. W. Eder (Eds.), *The Employment Interview: Theory, Research, and Practice*. Beverly Hills, CA: Sage Publications. (In Press).

8. MEDLEY, H. A. *Sweaty Palms: The Neglected Art of Being Interviewed.* Belmont, CA: Lifetime Learning Publications, 1978.

9. PURSELL, E. D., CAMPION, M. A., and GAYLORD, S. R. Structural Interviewing: Avoiding Selection Problems. *Personnel Journal*, 59:907-912, 1980.

10. CAMPION, M. A., PURSELL, E. D., and BROWN, B. K. Structured Interviewing: Raising the Psychometric Properties of the Employment Interview. *Personnel Psychology*, 41:25-43, 1988.

11. CROCKER, L. The Role of the Interview in Student Selection. *American Journal of Medical Technology*, 44:438-442, 1978.

Using MCAT Data in Admissions

Karen J. Mitchell, Ph.D.

This presentation was taken in large part from *Use of MCAT Data in Admissions: A Guide for Medical School Admissions Officers and Faculty*, which was published by the Association of American Medical Colleges in 1987 and distributed widely at that time. A copy of this work is provided as an official part of these proceedings.

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Selecting Nontraditional Applicants Using the Simulated Minority Admissions Exercise

William E. Sedlacek, Ph.D., and Dario O. Prieto

Objective

The objective of the Simulated Minority Admissions Exercise (SMAE) is to assist medical school admissions committees in improving the identification of variables pertinent to the selection of nontraditional applicants.

The SMAE demonstrates how educational techniques, such as simulation, active individual involvement, peer teaching, group discussion, and decision-making processes can be applied to the specialized area of minority admissions. It is intended to provide learning experiences as bases for attitudinal change in managing the minority admissions process.

The SMAE presents ten simulated nontraditional applicants, six of whom are to be admitted to medical school. The participants work in groups of five to six members, functioning as admissions committees in a specified medical or health professional school setting. The purpose of the Simulated Minority Admissions Exercise is to demonstrate how certain data might be identified in the application material and elicited from a personal interview with the applicants. This exercise encourages admissions officials to respond to current societal demands for a wider sociocultural mix of health care providers.

Strategy

The Simulation is planned for three one-hour segments. The focus of the first hour is on reviewing and interviewing the prospective applicants. In the second hour, each committee will decide as a group which applicants to admit or reject and will prepare a committee report. Each committee must select six applicants for admission and report its decision to the workshop leader. In the final hour, a presentation focusing on the outcome of each case study is made.

In the first hour participants assemble in small groups (committees). Simulation objectives and strategy are introduced. Each committee selects its chairperson. Each of the committee members is assigned two applicants for whom they serve as an advocate for acceptance or rejection. For each applicant, advocates review the application folder and then interview the applicant using the latent-image process. (This structured interview process is found in part two of the applicant's folder.) Time constraints require that advocates be selective with their interview questions. The recommendation for acceptance or rejection of an applicant must be supported by data obtained from the application file and the interview. An advocate worksheet is completed on the two applicants and is used as a basis for discussion.

In the second hour the committee meets. Each committee chairperson calls the group members together for a discussion of the process by which admissions decisions will be made. Six of the candidates are to be selected for admission. Each chairperson completes the committee report form.

The third hour consists of a general meeting led by the workshop leader. The workshop leader receives the committee report from each committee and displays admission decisions. The workshop leader directs discussion of the committee decision with emphasis on supportive data. The workshop

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63

leader reviews the minority admission process and assessment variables. The workshop leader reviews the simulated applicant cases and evaluates cases in terms of assessment variables. General discussion and evaluation of Simulated Minority Admissions Exercise follow. Participants complete the workshop evaluation.

Summary

The Simulated Minority Admissions Exercise (SMAE) is an educational technique that simulates a typical medical school admissions situation (1, 2). Its purpose is to train the participants to identify specific nonacademic or noncognitive variables in the student's application file and to elicit these further during the personal interview with the applicant.

The workshop is based on the research of Sedlacek and others (3-5). An evaluation of the SMAE by Sedlacek and Prieto revealed that 96 percent of the participants found the cases instructive, 88 percent found the cases realistic, and 80 percent found the SMAE process realistic of minority admissions (6).

The authors of this exercise suggest that the prescreening of minority applicants include noncognitive variables such as the positive self-concept, realistic self-appraisal, dealing with racism, preference for long-range goals to short-term needs, support person(s), leadership experience, demonstrated community service, and demonstrated medical interests, in conjunction with the more traditional admissions criteria such as GPA, MCAT scores, and letters of recommendation (1, 7).

References

1. PRIETO, D. O., et al. *Simulated Minority Admissions Exercise*. Washington, D.C: Association of American Medical Colleges, 1986.

2. BINGHAM, R. S. Equity Access: New Approaches to Minority Admissions. *Civil Rights Digest*, 10: 44-50, Winter 1978.

3. SEDLACEK, W. E., and BROOKS, G. C. Jr. *Racism in American Education: A Model for Change*. Chicago: Nelson Hall, 1976.

4. TRACEY, T. J., and SEDLACEK, W. E. Noncognitive Variables in Predicting Academic Success by Race. *Measurement and Evaluation in Guidance*, 16: 171-178, 1984.

5. TRACEY, T. J., and SEDLACEK, W. E. The Relationship of Noncognitive Variables to Academic Success: A Longitudinal Comparison by Race. *Journal of College Student Personnel*, 26: 405-410, 1985.

6. SEDLACEK, W. E., and PRIETO, D. O. An Evaluation of the Simulated Minority Admissions Exercise (SMAE). *J. Med. Educ.*, 57: 119-120, 1982.

7. PRIETO, D. O., and MENDOZA, F. Minority Admissions: Quo Vadis? *J. Med. Educ.*, 59:698-700, 1984.

Assessing the Admissions Process in an Era of a Declining Applicant Pool

Karen J. Mitchell, Ph.D.

One of the central concerns of admissions officers and admissions committee members is whether the selection procedures and criteria used in the admissions process are valid. It is important to know whether preadmission data predict adequately how well students will perform in the basic and clinical sciences at an institution. This knowledge is especially important in an era of decline in the absolute numbers of and academic quality evinced by medical school applications.

Articulation of Goals

Assessment of the selection process at one's institution should be a collaborative effort in which admissions officers, admissions committee members, student affairs officers, curriculum committee members, and faculty link institutional goals to admissions procedures and criteria. The process should begin with conjoint articulation of the institutional mission and curricular goals.

Statements of the goals of a medical education program might include, for example, (a) the provision of a firm background in the science of medicine, (b) the provision of a balanced introduction to clinical practice, (c) the promotion of attitudes of inquiry and lifelong learning, (d) the fostering of commitment to competent and compassionate health care, and (e) the preparation of a selected group of students for primary care in the state's underserved communities.

The second step in the evaluation of admissions procedures and criteria is to identify skills that underly success in the medical education program at an institution and in the profession. These characteristics might include, for instance, academic scholarship, motivation for science and medicine, human interactive skills, problem-solving ability, intellectual curiosity, self-instructional ability, professional seriousness, the ability to empathize, interest in medical care issues, and compassion for the problems of the underserved community.

Once these skills are defined, the establishment of links between institutional goals, the prerequisite characteristics noted in the second step and available or obtainable application data should be accomplished. Table 1 shows the linkages that can be drawn between goals, skills, and application data.

The final step in assessing an institution's admissions process and adapting it to the characteristics of the current applicant pool is the definition of a research plan to examine preadmission and performance data. Changes in the academic and other characteristics of today's applicants may call into question results of prior research. The *Standards for Educational and Psychological Testing* (1) state that those concerned with admissions should portray the relevance of selection procedures and criteria to admissions decision making and to subsequent performance of selected candidates at an institution. Examining the relationships between preadmission data--such as undergraduate GPAs, MCAT scores, accounts of extracurricular activity, and interview ratings--and performance in the basic sciences and clinical setting will provide important directions for admissions decision making. Such assessment is likely to shape a selection process that results in the effective and equitable identification of promising physician candidates.

The *Standards* say that the relationships between preadmission predictors and medical school performance measures should be described by correlation coefficients and regression equations.

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TABLE 1

Sources of Data on Prerequisite Characteristics

	Evidence of Prerequisite Characteristics	Sources of Information
1.	General scholastic achievement	Test scores, transcript, letters
2.	Success in recent relevant coursework	Transcript, letters
3.	Timely completion of academic program	Transcript
4.	Scientific and medical interest	Transcript, letters, application, supplementals, interview
5.	Student governance and community involvement	Letters, application, supplementals, interview
6.	Independent or individualized learning	Transcript, letters, application, supplementals, interview
7.	Outstanding/expert achievement	Letters, application, supplementals, interview
8.	Participation in rigorous activity	Letters, application, supplementals, interview
9.	Community service or clinical work	Letters, application, supplementals, interview
10.	Awareness of ethics, economics, sociology, aging issues	Letters, application, supplementals, interview
11.	Community health care issues awareness/participation	Letters, application, supplementals
12.	Underserved community residence	Application

Guidelines for computing correlational analyses can be found in univariate and multivariate statistics texts such as *Fundamental Statistics in Psychology and Education* (2) and *Multiple Regression in Behavioral Research* (3). Descriptions of these procedures may also be found in documentation for many statistical analysis software packages such as *Statistical Package for the Social Sciences (SPSS®) User's Guide* (4). Correlations between preadmission and individual or combined school performance data can be computed. In most cases, a more parsimonious picture of predictor/criterion relationships will be derived from a multi-correlational approach called multiple regression. This approach considers both the correlations among predictors and the relations between predictor and criterion, that is, medical school performance, variables.

Limitations of Data

Several caveats to the general correlational and regression procedures described by the *Standards* were noted in the *Use of MCAT Data in Admissions: A Guide for Medical School Admissions Officers and Faculty* (5). The first is that often basic science and clinical grades or ratings do not draw distinctions among students that are useful for research purposes. For example, the vast majority of students may receive passing marks or high passes in a pass/fail system. This type of grading policy limits the amount of information available from correlational analyses. Rating systems with numerous gradations are more useful analytically. Alternatively, medical school performance data may not reference attributes that a faculty considers critical to the effective provision of patient care; for instance, values and attitudes that promote concern for the individual and society are important to physician practice. Special attention should be paid to preadmission information that mirrors these judgments even if criterion data ignore such characteristics.

A second and related limitation is that much of the valuable information provided in application folders is difficult to quantify for research or selection purposes. For example, it is difficult to quantify data provided by personal statements, letters of evaluation, and accounts of extracurricular work or research experience. Efforts should be made to assess these rich sources of information as early in the decision-making process as is possible. These sources may reflect personal characteristics that account for important differences between students in medical school performance.

A third limitation to the approach described in the *Standards* is that medical school performance data are unavailable for applicants who were not selected. The nonselected pool typically represents a broader range of preadmission characteristics than the selected group. It is possible that many applicants who were not admitted would have succeeded in medical school. The characteristics of students for whom school performance data are obtainable reflect the selection constraints imposed in previous years. Because data for selected students are limited, the information provided by correlational analyses is somewhat restricted. Lord and Novick (6) describe a procedure outlined by Lawley for estimating predictor/criterion correlations in the nonselected pool.

Conclusion

Despite these caveats, research of this type is likely to inform admissions decision making and provide for the selection of promising candidates. Careful articulation of the goals of your medical education program, identification of the skills deemed critical to success in medical school and physician performance, and the establishment of links between these skills, goals, and available applicant data at each screening stage are likely to result in increased admissions decision-making validity.

References

1. American Educational Research Association, American Psychological Association, and National Council on Measurement in Education. *Standards for Educational and Psychological Testing*. Washington, D.C.: American Psychological Association, Inc., 1985.

2. GUILFORD, J. P., and FRUCHTER, B. *Fundamental Statistics in Psychology and Education*. New York: McGraw-Hill, Inc., 1978.

3. KERLINGER, F. N., and PEDHAZUR, E. J. *Multiple Regression in Behavioral Research*. New York: Holt, Rinehart and Winston, Inc., 1973.

4. *SPSS*[x] User's Guide, (2nd Ed.) Chicago: SPSS Inc., 1986.

5. MITCHELL, K. J. *Use of MCAT Data in Admissions: A Guide for Medical School Admissions Officers and Faculty*. Washington, D.C.: Association of American Medical Colleges, 1987.

6. LORD, F. M., and NOVICK, M. R. *Statistical Theories of Mental Test Scores*. Reading, Massachusetts: Addison-Wesley Publishing Company, Inc., 1968.

Combining Academic Qualifications to Assess Fill Rates and Graduation Rates

Wendy L. Luke

Introduction

The purpose of this research is to develop methods that may be useful in the evaluation of medical school admission procedures. Academic qualifications of applicants, matriculants, and graduates are examined from this point of view. National-level data are used to illustrate methods for assessing fill rates and graduation rates. These rates are examined because they link academic qualifications with admission decisions and outcomes. Fill rates, the percent of applicants who matriculate, reflect the judgments of admissions committees about the predictive ability of particular levels of academic qualifications. Graduation rates indicate to some degree the accuracy or success of those judgments.

While it is recognized that the quantifiable measures of preparation for medical school are only a part of the information considered about each applicant, the MCAT and GPA are often heavily weighted in initial screening processes and used with other information in the final selection of students. With this in mind, this paper presents techniques for using such quantifiable measures to guide efforts to evaluate admission processes and decision making. Although GPA and the MCAT are not the only criteria by which applicants are judged, they are perhaps the most standardized measures available. Therefore, the approach taken was to use these two measures together to help assess which levels yield the most reliable outcomes and at what levels other factors may need to be utilized to a greater extent.

To do this it was necessary to construct a relatively simple method of displaying the MCAT and GPA levels of the applicant pool. Such a method, developed by Dr. Cynthia G. Tudor and the author at AAMC, combines scores on the six MCAT subtests without averaging or summing. This grouping of MCAT scores is then crosstabulated with GPAs to produce a matrix of the number of applicants in each GPA and grouped MCAT level. The matrices are shown here for the number of applicants, matriculants, and graduates, and the percent of matriculants who graduate. Examination of fill rates and graduation rates within the matrix shows systematically who matriculates and completes medical school in terms of their academic qualifications, thus providing information about GPA and the MCAT as criteria of admission. Specifically, the matrices show which combinations of MCAT scores and GPA have not resulted in graduation.

This paper describes the procedures on how to read and work with the techniques referred to as the grid. Fill rates and graduation rates of the 1981 national applicant pool are presented. Implications of varying levels of graduation rates that may be revealed by this methodology are suggested.

Methods

A description of the basis for development of the grid and instructions on how to use it follows. MCAT subtest scores were grouped into four score ranges based on the mean scores and variance for the total applicant pool. The four score ranges are as follows: high (12-15), above average (9-11), medium (7-8), and low (1-6). All possible arrangements of these ranges were delineated for the science subtests and the skills analysis subtests, separately (such as the combinations of science HHHH and skills analysis HH mean that an applicant scored between 12 and 15 on the four science area subtests and the two skills analysis subtests). This resulted in 30 science score and 10 skills analysis arrangements of score groupings. The arrangements (such as HHHH) were examined

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with cross-tabulations in order to determine the distribution of applicants among them. They were then further combined according to the frequency of each arrangement among applicants and the appropriateness of combining scores of different levels. This process resulted in 8 combinations of science MCATs and 4 of skills analysis scores. Finally, using a cross-tabulation of the science combinations by the skills analysis combinations, the two types of scores were combined into one overall pattern with 26 categories.

Grade-point averages were grouped according to half-point levels for averages below 2.50 and quarter-point levels for averages above 2.51, resulting in seven categories. Cross-classifying the MCAT category, described before, by the GPA category gives the number of individuals who possess certain academic qualifications (See Table 1).

Tables 2 through 4 show the number of 1981 applicants, 1981 matriculants of that cohort, and the percent of 1981 matriculants who graduated. Examination of these tables shows the number and the percent of students who successfully matriculate and graduate at different MCAT and GPA levels. For example, Table 2 shows that in 1981 there were 595 applicants with a GPA from 3.01 to 3.25 and MCAT scores in category 9 (see Table 1). Of those, 291 or 48.9 percent matriculated, and of those matriculants, 280 or 96.2 percent graduated. These were students with fairly strong MCAT scores and the graduation rates in this section of the table are expected to be high. Most cells in the upper right corner are 90 percent or higher. By comparison, in the cells representing students with lower scores, graduation rates range from 54.7 percent to 100.0 percent.

One potential use of the grid methodology would be to compare graduation rates in different cells to identify those levels of MCAT and GPA where graduation was less likely. Individuals with these levels of MCAT and GPA may be the focus of more in-depth research on non-quantitative or non-academic indicators of success in medical school. In other words, the grid can be used to determine what combinations of academic qualifications call for further investigation of other measures of preparation and ability to complete medical school; it can frame or focus more detailed and comprehensive research.

These techniques, which represent ways of utilizing both MCAT and GPA simultaneously without summing or averaging the MCAT subtest scores, are presented as possible preliminary steps to evaluation of admissions committees' decisions. Additional applications of the methods presented here might focus on outcome measures other than graduation, such as indicators of academic difficulty prior to graduation or non-graduation, length of time required to graduate, or post-graduate success in residency or practice.

TABLE 1[1,3]

MCAT Score Categories

Skills Analysis Score Translations[2]

Science Area Score Translations[2]	HH HA	HM AA AM	MM HL AL	ML LL	Rationale
HHHH	1	2	3	3	All scores of 12+
HHHA	4	5	6	7	Up to 3 scores in 9 to 11 rest are 12+ (or more)
HHAA	4	5	6	7	
HAAA	4	5	6	7	
AAAA	8	9	10	11	All scores of 9 to 11
HHHM	12	13	14	15	
HHAM	12	13	14	15	
HAAM	12	13	14	15	Up to 3 scores in 7 to 8 range, rest are 9+
AAAM	12	13	14	15	
HAMM	12	13	14	15	
AAMM	12	13	14	15	
HMMM	12	13	14	15	
AMMM	12	13	14	15	
MMMM	16	16	17	18	All scores of 7 to 8
HHAL	19	19	20	20	
HAAL	19	19	20	20	
AAAL	19	19	20	20	One score in 1 to 6 range, rest are 7+
HAML	19	19	20	20	
AAML	19	19	20	20	
HMML	19	19	20	20	
AMML	19	19	20	20	
MMML	19	19	20	20	
MLLL	21	21	22	23	
HALL	21	21	22	23	
AALL	21	21	22	23	Two or three scores in 1 to 6 range, rest are 7+
HMLL	21	21	22	23	
AMLL	21	21	22	23	
MMLL	21	21	22	23	
ALLL	21	21	22	23	

[1]To Use Table:

1. Define scores of interest (e.g. science areas - all 9, 10, or 11; skills analysis areas 9 and 7).
2. Translate into letters shown below (e.g. AAAA; AM).
3. Find the intersection of the science area and skills analysis score translations. The number at the intersection is the MCAT Category number to use in Tables 2 through 4.

[2] H = High, MCAT score 12-15
A = Above Average, MCAT Score 9-11
M = Medium, MCAT Score 7-8
L = Low, MCAT Score 1-5

[3]Methods developed by Cynthia G. Tudor, Ph.D., and Wendy L. Luke.

TABLE 2

Number of 1981 Applicants in each MCAT Category by Science/Math GPA

	Grade-Point Average						
	2.01-2.25	2.51-2.75	2.76-3.00	3.01-3.25	3.26-3.50	3.51-3.75	3.76-4.00
MCAT Category[1]							
1	2	8	13	35	63	123	264
2	1	4	15	33	57	100	211
3	0	0	1	1	5	9	10
4	14	26	77	149	269	321	421
5	41	86	224	483	718	907	1059
6	5	17	22	34	82	95	108
7	1	1	14	23	31	42	43
8	15	18	43	105	104	101	87
9	92	143	345	595	887	831	640
10	15	23	61	109	179	160	114
11	10	18	26	55	80	107	61
12	19	28	62	92	125	104	99
13	221	345	753	1187	1372	1156	793
14	95	124	240	382	472	381	222
15	92	103	201	310	309	255	166
16	39	51	83	112	123	76	41
17	13	28	51	72	72	50	26
18	30	31	46	72	71	49	24
19	107	165	241	333	340	246	157
20	199	239	354	398	353	281	169
21	105	109	146	218	171	130	71
22	120	129	160	195	195	141	66
23	411	331	357	411	315	216	92
24	29	24	34	27	25	14	9
25	79	45	52	63	45	25	11
26	595	359	342	297	203	101	46

[1]See Table 1 for definitions of MCAT category numbers.

TABLE 3

Number of Matriculants in each MCAT Category by Science/Math GPA
1981

Grade-Point Average

MCAT Category[1]	2.01-2.25	2.51-2.75	2.76-3.00	3.01-3.25	3.26-3.50	3.51-3.75	3.76-4.00
1	1	6	5	30	50	105	239
2	1	1	7	26	43	89	203
3	0	0	1	1	4	8	10
4	3	8	31	98	212	268	368
5	12	27	97	297	533	789	950
6	1	5	4	16	54	72	87
7	0	1	5	10	20	25	36
8	8	6	22	63	73	80	78
9	25	36	125	291	571	671	570
10	3	2	20	43	100	114	97
11	3	5	8	26	30	63	38
12	5	6	22	52	87	87	79
13	47	68	217	497	785	788	647
14	23	29	46	133	206	221	163
15	28	27	47	75	106	134	105
16	10	10	14	26	46	39	30
17	3	7	7	19	26	17	18
18	9	9	11	16	20	23	11
19	18	23	37	86	133	117	95
20	49	57	72	75	118	105	74
21	17	10	17	32	38	53	27
22	18	23	23	23	45	36	20
23	77	62	52	80	62	54	33
24	0	0	5	1	5	1	0
25	7	5	2	8	3	4	2
26	53	39	31	38	32	12	9

[1]See Table 1 for definitions of MCAT category numbers.

TABLE 4

Percent of 1981 Matriculants in each MCAT Category
by Science/Math GPA who Graduated by 1987

	Grade-Point Average						
	2.01-2.25	2.51-2.75	2.76-3.00	3.01-3.25	3.26-3.50	3.51-3.75	3.76-4.00
MCAT Category[1]							
1	100.0	100.0	100.0	100.0	100.0	95.2	89.5
2	100.0	100.0	100.0	88.5	95.3	96.6	91.1
3	.0	.0	100.0	.0	100.0	100.0	100.0
4	100.0	100.0	100.0	94.9	97.6	96.3	92.1
5	91.7	92.6	99.0	94.9	97.9	95.9	95.9
6	100.0	80.0	75.0	87.5	100.0	93.1	96.6
7	.0	100.0	80.0	100.0	90.0	92.0	97.2
8	100.0	100.0	86.4	100.0	100.0	97.5	94.9
9	96.0	94.4	96.0	96.2	96.0	97.5	96.5
10	100.0	100.0	95.0	95.3	97.0	98.2	94.8
11	100.0	80.0	100.0	96.2	90.0	93.7	97.4
12	100.0	100.0	95.5	94.2	97.7	97.7	100.0
13	87.2	88.2	94.9	96.8	97.7	97.1	97.2
14	87.0	89.7	100.0	97.7	95.6	96.8	96.3
15	75.0	96.3	83.0	92.0	97.2	94.8	93.3
16	90.0	90.0	100.0	96.2	97.8	94.9	90.0
17	66.7	100.0	100.0	100.0	96.2	94.1	88.9
18	100.0	88.9	90.9	100.0	95.0	95.7	81.8
19	83.3	100.0	94.6	96.5	94.7	94.0	96.8
20	77.6	86.0	86.1	89.3	95.8	94.3	95.9
21	82.4	90.0	82.4	87.5	92.1	92.5	96.3
22	83.3	82.6	87.0	91.3	91.1	97.2	100.0
23	80.5	75.8	86.5	85.0	93.5	85.2	90.9
24	.0	.0	80.0	100.0	80.0	100.0	.0
25	57.1	100.0	50.0	75.0	66.7	100.0	100.0
26	54.7	76.9	67.7	84.2	84.4	75.0	100.0

[1]See Table 1 for definitions of MCAT category numbers.

PART 5

Marketing Medicine As A Profession

Promoting Medicine and Medical Careers 77
Kenneth H. Rabin, Ph.D.
Increasing Awareness of Ethical Considerations in Admitting Students 79
Billy Rankin
Comparing Medical School Matriculants and Non-Matriculants 81
Diane W. Lindley
Marketing the Profession 87
Elizabeth M. Martin

Promoting Medicine and Medical Careers

Kenneth H. Rabin, Ph.D.

The following analogies can be drawn between medical education and the market place:

1. Medical education is a product whose demand curve appears to be in decline.

2. Each medical school is essentially a "brand" of the product called medical education.

3. Admissions officer is analogous to the "brand manager" in this model. Brand manager's role is to increase market share.

4. Market research, promotion, and direct sales are tools available to the brand manager. How do you go about using these tools? Have your techniques changed as perception of a declining applicant pool has increased? Some of the tools available to the brand manager are videos, speakers bureaus, faculty/alumni, publicity/articles in key college newspapers or programs on major college radio stations, direct mail, summer programs, and precurricular programs.

5. Other tools the brand manager can call upon include new product development, new packaging of the product line extensions, and new pricing policies. These may be easier tools for a brand manager at Proctor and Gamble to use, but they are clearly necessary tools to consider in the medical school admissions business:

- Do you offer the same old three-year degree?
- Is your curriculum a carbon copy of all the other curricula in this country?
- Have you looked at 3/3 programs? MD/MBA programs? MD/LL.D programs? Programs for nurses and pharmacists, even part-time ones?
- Have you tried tuition discounts for early decisions?

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6. Good market research can help you defend sometimes radical ideas to the medical dean and faculty.

- Survey students whose profile defines them as desirable.
- Survey those you accepted who turned you down.
- Survey those who accepted admissions, paying particular attention to your "blue chips."
- Survey alumni, particularly distinguished recent ones.

7. To summarize, in a classic marketplace, you and your school are competing with others for a greater share of a market that is either remaining constant in size and quality or, worse still, shrinking. A good promotional program based simply on astute promotion and selling may increase your share of a shrinking pool, but it's more likely that extensive product design changes will allow you to carve out a position that is truly unique.

Rebuilding the Total Pool

To rebuild the total appplicant pool a national collaborative program promoting the rewards of a medical education is needed:

- Key research question: What is the "responsive chord" for today's undergraduate?
- Core print and video materials that all can use.
- National seminars, debates, and publicity on issue--are we in danger of losing best minds to other fields just when needs of an aging society will become most urgent?
- Involve young physicians and faculty in design of campaign elements.
- Judge value of effort by monitoring growth of total applicant pool.

Such an effort does not compete with individual college's efforts and should be funded by contribution from all.

Increasing Awareness of Ethical Considerations in Admitting Students

Billy Rankin

All too often we fail to recognize the full effects our individual school's policies, procedures, and daily practices have on others, especially others with whom we have little or no routine interaction. It is rare for admissions officers from across the nation to have the opportunity to meet as a unique group and interact or discuss topics of mutual interest. It is, therefore, not surprising to find divergent opinions and attitudes among the regions with regard to admissions practices.

The brief case studies that follow can be used to pose ethical dilemmas and illustrate situations in which the desires, rights, and responsibilities of applicants, admissions officers, admissions committees, and health professions advisers come into conflict. "AAMC Recommendations Concerning Medical School Acceptance Procedures for First-Year Entering Students" (traffic rules) can help sort out these dilemmas (1). One way to promote ethical behavior would be for admissions officers to work through the AAMC on a continuing basis to review, update, and actively support the recommendations for admitting medical students. Additional steps are in order to encourage all medical schools to better observe the recommendations.

Six Case Studies

1. During the month of July, an applicant holding places in three medical schools, who has held them for one month, says he needs financial aid information before he can make up his mind which school to hold. You check with your financial aid officer and the applicant has not filed a financial aid application at your school.

2. During the month of March, Applicant #2 on your alternate/wait list calls to say thatmedical school X has notified him that as of the first of next month he must pay the first installment of his tuition at school X or withdraw.

3. You receive a call about an applicant you just interviewed whom the admissions committee rated very high. The caller of known credibility is unwilling to provide a written statement but assures you that the applicant is untrustworthy and was observed cheating on an exam; however, the honor council failed to recommend dismissal because the student in question had no prior record. Other students are aware of this behavior and tend to avoid the person.

4. A husband and wife are interviewed and the admissions committee ranks the wife high and she is admitted. The husband is evaluated low and you think you might not be able to offer him a place. The wife calls and says she must withdraw by the end of the month if you are not able to accept him.

5. An accepted applicant writes that he will be unable to complete the second half of one of the required science courses and wishes you to waive this requirement. He has excellent grades and MCAT scores and was rated highly by the admissions committee.

6. Despite national guidelines to the contrary, you have been told on numerous occasions that a sister institution offers special deals to some applicants (not early decision), that is, the offers of acceptance would be made before the date specified in the guidelines, provided the applicants would commit to that school and withdraw their applications from all other schools.

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Reference

1. AHARI, V. W. (Ed.) *Medical School Admission Requirements, 1989-90.* Washington, D.C.: Association of American Medical Colleges, 1988.

Comparing Medical School Matriculants and Non-Matriculants

Diane W. Lindley

Introduction

The purpose of this research was to compare the differences in the perceptions of medicine and the medical profession among matriculants and non-matriculants to medical school.

Sources of Data

The data on matriculants are from the 1987 Matriculating Student Questionnaire (MSQ). This is an annual survey administered by the AAMC of first-year entering medical students at all U.S. medical schools. The questionnaire collects data on sociodemographic characteristics, career plans and interests, and attitudes toward medicine of these students. The response rate in 1987 was 82 percent (N = 13,116).

Data on non-matriculants are from an early 1987 survey of 984 individuals who were accepted to a U.S. medical school in 1986 but did not matriculate. The response rate to this survey was 47 percent (N = 464). Of those respondents who returned their questionnaires, 62 percent (N = 288) indicated they had received a deferred admission and would matriculate at a later date.

Results

On both questionnaires, respondents were asked to indicate whether they agreed or disagreed with a list of statements pertaining to medicine and the medical profession (Table 1). The results showed substantial differences between first-year medical students and non-matriculants. There were also differences among non-matriculants that is, between those students who received a deferred admission and those who did not.

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It might be expected that non-matriculants would be more pessimistic about medicine while first-year students would be very optimistic about the profession; however, as Table 1 shows, this is not the case. For example, about 91 percent of first-year students agree that "medicine will not be as financially rewarding in the future as in the past," as compared to about 43 percent of non-matriculants. The reasons for the difference in attitudes among these groups are unclear. It may be that first-year students are simply more realistic and better informed about medicine; another possible reason for these differences is the format of the questionnaire.

In addition, there were statistically significant differences between men and women for all the perceptions of medicine included on the MSQ and for the first three perceptions on the Non-Matriculating Survey (Table 1). A higher percentage of men than women agreed with these statements. Differences by ethnic groups were statistically significant only on the MSQ, with white respondents more likely than minority respondents to agree with the statements.

As indicated earlier, 62 percent of the respondents to the Non-Matriculating Questionnaire said that they were holding a deferred admission and would matriculate at a later date. Reasons given for delaying their entrance into medical school varied widely. Most people, however, seemed to be delaying for a specific reason. That is, most were committed to attending medical school but needed time off from school to accomplish a specific goal: to finish a Ph.D. or another degree, to gain practical experience and earn money needed for school, or to take a break from school. They seemed to be determined to enter medical school and had definite ideas about how they could best prepare themselves

beforehand. A follow-up check revealed that 73 percent of this group did matriculate in 1987.

Table 2 examines the non-matriculants who did not have a deferred admission and the responses they gave on the questionnaire about why they chose not to attend medical school (N = 173). Respondents were given a list of reasons for not matriculating and asked to check all those that applied to them. The most frequent reason checked is "Other, please specify." The reasons given varied greatly and were difficult to classify. A dozen respondents indicated that they had decided to attend graduate school or to pursue another career. Several of these respondents wrote that while they were waiting to hear whether they had been accepted to medical school, they were offered a job or a graduate fellowship and chose those options instead of medical school. One wonders if they had heard from their medical school earlier if they might have chosen that route instead. Another 9 or 10 people wrote that their acceptance to medical school came too late--in some cases on the day of registration. It was too late then, they said, for them to move, find a place to live and a job for their spouse, and so on. Another 8 to 10 people felt that they were not ready for the pressures of medical school. Other people were very negative about medicine and/or medical school and clearly wanted nothing to do with the profession.

Financial concerns were mentioned by a large number of people: general financial concerns, anticipated debt, and the direct costs of attending medical school. About 9 percent indicated they could not obtain enough financial aid to enable them to attend medical school.

Another disturbing finding emerges from this analysis. About 29 percent of these people said that one of the reasons they did not matriculate was that physicians with whom they had counseled were not encouraging about the future of medicine.

When asked to rank the most important reason for not matriculating, about 50 percent of the non-matriculants indicated either "Other" or "Personal circumstances." As we have seen, these two responses mean approximately the same thing. Twelve percent wrote that their interests in science could better be satisfied by another career, and another seven percent gave "anticipated debt" as the most important reason. There were no significant differences between men and women or among ethnic groups in their reasons for not matriculating.

As to what they were doing instead of attending medical school, 60 percent stated that they were currently employed. About 40 percent of these people could be classified as being in non-health professions occupations, 10 percent were in one of the other health professions, and the remainder were in non-professional occupations. Fifty percent were currently enrolled in school either part-time or full-time. Nine percent were in health-related educational programs, and 28 percent were in some type of graduate program. Only 38 percent of the non-deferred non-matriculants indicated that they had plans to reapply to medical school. A follow-up showed that about one fifth of this group matriculated in 1987.

The next step in the analysis was to determine if there were any differences between the deferred and non-deferred individuals using data from the SAIMS database. There were no statistically significant differences in terms of parental income, total educational debt, or parents' occupation (although there were twice as many physician fathers among deferred students). There were, however, statistically significant differences in fathers' education and mothers' education. The parents of deferred students had slightly higher levels of education than the parents of non-deferred respondents. Another significant difference was observed in the response to the question that asked when they had definitely decided upon a career in medicine. Those respondents with a deferred admission had decided upon a career in medicine at an earlier point than had non-deferred respondents (that is, 19 percent during high school compared to 14 percent of the non-deferred). A comparison of the

academic qualifications of these two groups showed that while the non-deferred group had slightly higher GPAs than the deferred groups, there were no statistically significant differences between the two groups in either GPAs or MCAT scores.

Conclusions

What do these results mean for medicine? First, we may conclude from the data on perceptions of medicine that this year's matriculants are well-informed about the changes in medicine that will affect their futures. The majority of these students agree that medicine will not be as financially rewarding in the future as in the past and that legal liabilities and malpractice premiums are major problems. However, they still want to become physicians or they would not be in medical school. They are attracted to medicine, therefore, by other factors. What these factors are is unclear.

An attempt to answer this question was made by asking respondents to the MSQ to indicate the most important factor in their choice of medicine as a career goal. Fifty-three percent indicated that the most important factor was "interest in helping people"; 20 percent indicated "intellectual challenge"; and 16 percent stated the "opportunity to use special talents and abilities" was the most important factor.

The data on non-matriculants suggest that several concerns should be addressed. While it is probably not possible for schools to improve students' personal situations, the issue of financing is one that might be changed. If the fear of financing a medical education and being burdened with large debts after graduation is driving students away from medical careers, something needs to be done. There are no easy solutions to this problem. Another problem is the negative feedback that applicants are receiving from practicing physicians about medicine. What can be done about this? As a first step, it would be useful to find out who these physicians are. Are they family physicians? Family members who are physicians? Exactly what are they telling students?

The last problem is that of students deciding to enter other graduate programs or careers. What is it about these other fields that attracts them? How can we attract students to medicine?

TABLE 1

Percent Who Agreed With These Perceptions of Medicine

		First-Year Students[2]	Non-Matriculants[1] Deferred	Non-Matriculants[1] Not Deferred
Medicine will not be as financially rewarding in the future as in the past.	Agree	90.7	41.3	45.7
Physicians will not receive the same respect from society in the future as they have in the past.	Agree	43.7	21.5	27.2
Changes in the health care system are impairing physicians' independence.	Agree	84.2	33.0	42.8
Physicians' legal liabilities and the high cost of malpractice insurance are major problems.	Agree	97.6	55.9	72.8
The demands of a physician's work interfere too much with family relations.	Agree	59.7	26.4	46.8
The demands of a physician's work interfere too much with other interests and pursuits.	Agree	47.6	17.4	32.9
Physicians who care for people are considered less important than specialists who can use complex tests and technologies.	Agree	2.1	8.7	12.1

[1]Source: 1987 Non-Matriculating Student Questionnaire, AAMC. Non-matriculants are divided into 2 groups: those holding deferred admissions and those without.

[2]Source: 1987 Matriculating Student Questionnaire, AAMC.

TABLE 2

Reasons Given by Non-Matriculants for Not Matriculating to U.S. Medical Schools, Class of 1986[3]

	Percent Respondents[4]
Other	59.1
Financial concerns	41.5
Financial--anticipated debt	33.5
Doctors not encouraging about the future of medicine	28.7
Interests in science better satisfied by other career	28.7
Personal circumstances other than financial	28.0
Financial--direct costs of medical school	24.4
Dedication to helping others better satisfied by other career	20.7
Not accepted to school of choice	20.7
Study of medicine not intellectually stimulating	18.3
Predicted physician surplus	15.2
Financial--rewards do not justify the time and money invested	10.4
Financial--unable to obtain enough financial aid	8.5
Did not receive encouragement from family	6.7
Medical school curricula too intense	6.1
Too much competition among medical students	4.3

(N = 173)

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[3]Source: 1987 Non-Matriculating Student Questionnaire, AAMC.

[4]Respondent could indicate more than one reason.

Marketing the Profession

Elizabeth M. Martin

AAMC is developing a national strategy and program to attract qualified individuals to a career in medicine. This program will focus on a number of concerns: (a) the decline in the number of applicants to medical school, (b) the possible decline in the quality of applicants to medical school, (c) the cost and length of medical school as deterrents to applicants, (d) the continuing underrepresentation of minorities in the medical applicant pool, and (e) the reports, (anecdotal or substantiated) that some physicians are discouraging students from applying to medical school by bad-mouthing the profession.

The project I am about to describe is a first step in a national program designed to attract highly qualified individuals to careers in medicine. The program is being designed and carried out at AAMC but its success depends on those in the medical schools.

There are three objectives in the AAMC "Career in Medicine" program: (a) to convey an accurate picture of medicine as a career; (b) to encourage qualified individuals to consider a career in medicine; and (c) to encourage the medical education community and practicing physicians to promote medicine as a highly desirable career and profession.

The first project in the program is the development of a videotape and related materials for use by the medical schools.

We are in the information-gathering/research stage of this project. As we started the project we asked ourselves several key questions. The answers reflect the results of our research.

Who is the audience?

The primary audience, as we see it, are college students and their premedical advisers and high school students and their counselors.

The secondary audiences are medical school alumni and parents, county medical society members, and selected community organizations.

The tape can be integrated into the medical school's speakers bureau or incorporated into talks given by the dean and department chairs and faculty when speaking to alumni, parents, and community groups. It also can be included in the resource library of premedical advisers and high school counselors.

What is the major message in this videotape about the profession?

Initial research indicates that we should concentrate on two major messages in the tape. The first is that medicine is a helping profession. It helps people both to stay well and to recover from illness. And because of diagnostic and therapeutic advances we can do this better than ever before. Secondly, medicine has great intellectual challenges and is rewarding professionally, personally, and economically, and has a wide variety of career opportunities.

What do we want people to do?

Consider and pursue medicine as a career.

How will the tape be marketed and distributed?

The tape will be distributed to medical schools, primarily to admissions deans and faculty on admissions committees, the key people using this tape in recruitment campaigns. However, deans, department chairs, and faculty members who speak to various groups of alumni, parents, community leaders, educators, and so on will find the tape useful when talking about medicine as a changing, growing, and exciting career.

We will also market the tape through the National Association of Advisors for the Health Professions, the Association of American School Counselors, the Association of Secondary School Principals, and others.

Ms. Martin is Vice President for Communications, Association of American Medical Colleges.

How long should it be?

Eight to twelve minutes is a flexible and adaptable length. It fits well into a 30-minute program or can be used as a stand-alone piece for students in a career reference library.

Let me go back to the audience for this tape for a moment. Originally we had planned to make one tape aimed at college students. As our research progressed, it became clear that there also was a need to reach high school students, their counselors, and their parents. The next stage of our research effort is to determine if we need a separate tape for each audience or if one tape can reach students in high school as well as college.

Other elements in the plan include a brochure to be used as a handout with the tape. It will explore the questions addressed in the tape in more depth and will address other areas of concern not covered in the tape. There also will be space on each brochure for individual schools to add their name and a contact for further information. We are considering developing a discussion guide for use by alumni and others who use the tape and who are not as familiar with medical education issues and the concerns of young people.

The last piece we are considering is development of a sample video script that medical schools could adapt and use when producing a videotape about their school. The script would be a guide for schools to use to help them focus on producing the sharpest, most distinctive profile and to showcase their strengths and unique programs. The sample script would complement the AAMC script and reinforce the major messages.

We have a number of other projects to explore and test. One is a more aggressive effort to reach health career advisers through their publications and meetings. If they do not have the facts, students interested in medicine will not receive accurate information.

Another effort the Association will be undertaking is in the area of minority recruitment. The AAMC has established a new Division of Minority Health, Disease Prevention, and Health Promotion to be headed by Herbert W. Nickens, M.D., M.A. Dr. Nickens will be consulted in development of the materials aimed specifically at underrepresented populations. This is a high priority for both the Association and its constituents.

The AAMC's Division of Communications looks forward to working closely with the medical schools as it moves in these exciting new directions.

PART 6

Marketing Your Medical School

Increasing Your Awareness of Student Needs 91
John Eudes
Knowing Your Customer and Your Competition 93
J. Daniel Beckham
Developing Northwestern's Medical Student Recruitment Package 95
Ellen Soo Hoo
Magnifying Your Voice and Multiplying Your Messages 99
Joan Hartman Moore

Increasing Your Awareness of Student Needs

John Eudes

As the number of applicants fall, an institutional strategy must be developed to secure a larger percentage of the applicant pool. Assume that students shop for schools. Education is a service, and the following are criteria by which people evaluate services:

Cost or Consideration

Financial and psychological costs should be considered. Think about the "hassle factor" at your institution. For example, do you repeat requests for the same information on each application form? If so, try to eliminate duplication. Reduce the psychological cost of coming to your school by working with a local moving company, bank, and real estate firm to put together a relocation package that simplifies the moving process for incoming students.

Access or Availability

Could your admissions office be more accessible? For example, undergraduates live by a different schedule than most of us. Install a phone-answering machine so that applicants can call with questions during the middle of the night.

Mr. Eudes is Associate Administrator and Director of Marketing, University of Alabama.

Promotion or Communications

Create systems that allow you to communicate with applicants as individuals throughout the process. Develop an individual file for each student. Send them materials that coincide with their interests.

Service Enhancements

Refine and expand services such as career placement for the spouse. Explain your residency program and how you can help them pick that first placement.

Summary

These are "leading indicators" that you are student-sensitive and that you think about students as individuals. They do not need to cost a lot of money and do not constitute a visible marketing program. They are examples of effective information exchange and assistance. For more ideas get professional help from your business school, your hospital marketing staff, a business advisory board, or hire a consultant for a day or two. Involve your clinical and basic science faculty. Clinical faculty will get you your residents.

Knowing Your Customer and Your Competition

J. Daniel Beckham

The objects of marketing are two moving targets. These targets are the customer and the competition. The object is to deliver greater value from your applicants' points of view than your competition does.

Get close to your "customers"; get to know them and what they really want. Find out how your students differ from those who choose other schools. Listen: what motivates students; what scares them. Then do research. Get help from your business school to do focus groups. Keep looking over your shoulder. Know what your competition is doing.

Differentiate what you are doing from what the competition is doing. Read *Positioning: The Battle For Your Mind* by Al Reese and Jack Trout. Positioning is differentiating yourself positively from your competition. The classic examples is Avis vis-a-vis Hertz--"We Try Harder." The auto industry provides similar examples, for example, Pontiac's "We build excitement" is selling excitement, not just cars.

Focus your resources. You can't succeed by being all things to all people. Pick two or three areas and spend your money marketing those. Exercise "program pickiness" and "allocation extravagance." Concentrate on the segments of the medical education market you want--geographic, socioeconomic, psychographic.

Build on that at which you are best; leverage your strengths into benefits--especially leverage against your competitors' weaknesses.

Build beyond communications--that is, market the product, the pricing, and the access.

Have a plan. Know where you are going and have a plan for getting there. Know who your customers are, who your competition is, and how you are going to price, provide access, and communicate your product.

Mr. Beckham is President, The Beckham Company.

Developing Northwestern's Medical Student Recruitment Package

Ellen Soo Hoo

Publications are important in developing medical student recruitment packages since they probably are the first point of contact with applicants. They have the power to convey your school's image, to pique the interest of the kinds of applicants you want--people who will be happy and successful at your school--to provide answers to their questions, and to motivate them to find out more and to complete applications.

But, publications also have the power to turn off potential applicants. We have all seen those that have little visual appeal or they are so poorly organized that their use is difficult.

What goes into producing effective recruitment publications? You're probably thinking--money. But in today's climate, can you afford not to invest in effective materials? We spend about $25,000 a year on our recruitment publications. Compare that to our tuition, which is now more that $17,000 per year.

Our University publications manager recently said to me, "Good design and recruitment strategies don't have to cost a lot of money." What they do take, however, are a commitment of time and energy to analyze the situation at your school and figure out the best ways to improve it.

At Northwestern I've been involved in producing the medical student recruitment publication for 10 - 1/2 years. Until two years ago, we had a typical catalog or bulletin that contained basic information on the school's history, how to apply, department and hosptial descriptions, and faculty listings. The catalog had grown by leaps and bounds as it tried to be all things to all people.

Ms. Soo Hoo is Director of Publications and Public Relations, Northwestern University Medical School.

To save money, we had used the same design and format for several years. It was probably innovative when it first came out, but towards the end, even we felt it was dull and boring. We've always used student interviews to tell the Northwestern story, a technique we borrowed from the undergraduate recruitment publications.

My department, which has three writers including me, came into existence four years ago because our present dean, Harry Beaty, was interested in improving communications with the school's many constituencies. Our number one priority at that time was to improve the alumni publication. When *Ward Rounds* was well under way, we turned our attention to the student recruitment materials. Eventually we assumed responsibility for producing most of the publications of the admissions and student affairs offices.

We were aware of predictions that the applicant pool would shrink, but that was not a major concern. The approach we used in updating the catalog was the same as everything else we do at the Medical School under Dean Beaty's enlightened management style.

First, we do a careful analysis of the situation. We determine objectives and devise strategies to meet the objectives. A proposal is developed, and we try to achieve a consensus among the school's leaders. Then we carry out the proposal as cost effectively as possible.

Borrowing a technique from marketing research, we convened a focus group of first-year students who could still remember how they felt as applicants to critique the catalog and give us suggestions on what information should be included. The students told us they liked the student interviews but that printing the names and titles of all 2,000 faculty members was meaningless. That gave us the

courage to drop the faculty listings, as well as photos of the department chairmen.

We talked at length with the admissions staff about what information should go into the publications, how they are used, and what specific problems they have. Then we surveyed all the department chairmen and key administrators on the type of image we wanted to convey about the school.

From the beginning, I worked very closely with Dr. Michael Altman, associate dean for educational programs, and his staff. We had a number of brainstorming sessions. Then Dr. Altman and I developed a proposal for a complete recruitment package that we first presented to the dean and then to the Council of Chairmen. Since these recruitment publications represent the entire school, we wanted to make sure the key people were behind us. This is part of achieving consensus.

After two years, all the pieces we proposed have been produced. We're now in the process of creating one we didn't even think of--a fact sheet, that will be tailored for recruitment as well as general information. The cost of producing our recruitment package runs about $25,000 per year, which is less than one issue of our magazine.

The package consists of the following:

A pocket folder, which matches the catalog. The per unit cost is about 75 cents.

The viewbook is our main recruitment piece. It goes to anyone who writes, calls, or drops by asking for information, as well as to premed advisers, on how to apply to the Medical School. We went to a two-year book in order to save money and staff time. In fact, wherever possible, we try to print a two-year supply. Student interviews are used to introduce five major sections in the viewbook. The opening spread is a section on cultural and recreational activities in Chicago, something else our students told us was important. The color photo on the front emphasizes our beautiful lakefront location. Each viewbook costs about $3 to produce on a press run of 12,000. We print a mid-cycle update that contains tuition information and the list of graduates and where they are going for residencies; with a press run of 6,000, this piece costs 36 cents.

The *Opportunities for Minority Students* brochure aids the admissions staff in minority recruitment. It heavily depends on interviews--students and alumni--to tell our story. Per unit cost is $2.53; the press run was 2,000.

The *Student Handbook* took 18 months to produce because some of the policies contained in it did not exist when we began. Interspersed among listings of restaurants and banks were the school's official policies. To save money, we put a nice cover on it and just used typewritten body copy that comes off the letter-quality printer in our office.

For the financial aid brochure an illustrator created a drawing based on ideas solicited from the financial aid people. We were not able to go to a two-year publication because financial aid policies change so quickly. On a press run of 1,050, the per unit cost is $.00.

When an applicant comes to Northwestern for the personal interview, he or she receives a folder stuffed with the student handbook, housing and financial aid information, and one or two issues of *Ward Rounds*, which we feel presents a good overview of the school.

At Northwestern we're competing for the brightest and the best. We have a fairly high percentage of our accepted students going elsewhere. Often, tuition and financial aid play major roles in these decisions. Last year we developed a retention newsletter called *Medical School News*. Published four times between February and August, this newsletter packages basic information that was already going out with stories trying to make the readers feel a part of the Northwestern community. We run stories on such topics as housing, health insurance, and financial aid, as well as those on student activities and administrators.

This year we're planning to evaluate the newsletter through a readership survey and interviews with members of the entering class. The newsletter costs about 40 cents each; we print 425 per issue. This is the only piece we have printed internally. Everything else goes to outside vendors.

Summary

Professional communicators have been involved in recruitment at Northwestern for a long time. Work with your public affairs people or other communications professionals. There is no room in recruiting for the inexperienced--be it a writer, designer, photographer, typesetter, or printer.

A coordinated package of recruitment publications tells applicants that your institution "has its act together," and each piece can reinforce the image you have chosen to convey.

In all publications, try to get into consumers' heads to find out their need. Do some informal market research; it doesn't take a lot of money.

The communicators cannot do it alone. We work closely with our admissions people. If we did not have in place at Northwestern an excellent admissions process that treats every applicant as a special human being, all fancy publications that money could buy wouldn't help a bit. Incidentally, we're still getting about 3,500 completed applications for 110 openings.

Recruitment publications are part of an ongoing process that needs constant evaluation. Ever so often, take a hard look at your publications to see how well they are working.

I want to share one success story. A year ago, the chairman of the Department of Medicine asked me to do a special recruitment publication for the Department's residency programs. Northwestern had done poorly in the match, like most medicine programs across the country. I was skeptical and told him that a publication alone would not increase applications. But the chairman assured me that the publication was only one part of their stepped-up recruitment activities.

We did a booklet for them that was relatively inexpensive, with a nice cover and typewritten copy inside, containing faculty-written essays on what internal medicine is all about and particularly what's happening at Northwestern.

The booklet is distributed to our junior and senior medical students and to those who come for residency interviews. The department also held a number of open houses to encourage faculty/student discussion on careers in internal medicine.

In this year's match, while only 65 percent of internal medicine residency positions across the country were filled, Northwestern filled every one of its openings. We are in the process of re-doing this booklet and increasing the press run.

The lesson from this success story that can be applied to medical student recruitment is that the publication by itself would not have worked. It was the willingness of faculty and administrators to reach out--to recruit. The booklet merely helped.

Magnifying Your Voice and Multiplying Your Messages

Joan Hartman Moore

In attracting students to your institutions, you need many voices to speak for you, because the more sources a message has, the greater its credibility is perceived to be. That is one reason that award-winning faculty and those who are widely published in prestigious journals are highly prized.

Now that selecting students for admission to medical school involves drawing them in as well as screening them out, recruitment needs to be a process for the entire medical school, not just for the admissions officer. Recruit a committee from the public relations and alumni offices, the dean's staff, curriculum development, and your university's marketing and business programs. Use the committee to define your school's strengths. Come to concurrence on the strengths you want to promote and the kinds of students you want to attract. You may want to be the coordinator of this team, but you don't need to do it all.

Recommendations

Using your committee, you want to accomplish the following objectives to magnify your voice and multiply your messages:

1. Burnish your image within your own institution so that your students, faculty, and staff all speak well of you. Hold lunch-time seminars, use internal publications, recognize outstanding programs. Use your public relations, publications, personnel, and employee relations departments to help you.

2. Burnish your image within the local medical community. Appoint to advisory groups and task forces local physicians who do not hold faculty appointments. Host lectures, tours, and open houses for the county medical society. Ask your alumni office to offer honorary or associate memberships to local physicians or to create a special organization for them. Ask the dean to send a note welcoming each new physician to the community. Put local physicians on the mailing lists for your publications.

3. Burnish your image with your local/ business community. It can be a powerful supporter. Your university may be one of your city's greatest assets. In San Diego, the Chamber of Commerce instituted a variety of programs to introduce businessmen to the medical college and its research programs--and the businessmen paid for the privilege. The Chamber of Commerce also hosted a reception to honor UCSD's award-winning researchers for coming to San Diego and making it a better place to live.

4. Keep in contact with premed advisers at the undergraduate schools from which you want to draw students. Write to them from time to time to keep them informed about a particular program or research project. Host an on-campus program for them every three to five years.

5. Make inquirers and applicants and their families feel welcome and wanted. Offer courteous telephone responses and prompt mailings. Add all applicants to your mailing lists for campus publications--especially student newspapers and alumni magazines. If your publications office is willing, develop a special newsletter for applicants. Work with your city's visitor's bureau or chamber of commerce to create a packet of information about the community, including job opportunities for spouses and information about schools, churches, and recreational facilities.

6. Keep the information-gathering, application, and admissions process as simple as possible. Replace barriers and obstacles with gates and open doors.

Ms. Moore is Director, Section for Public Relations, Association of American Medical Colleges.

Summary Outline

Depending on funds and "people power," schools may develop a number of strategies. Some possibilities follow:

Low Funds/Low People Power

Produce one-color brochures.
Develop radio PSA's--live announcer scripts.

Create packets of existing materials--campus newspaper, alumni magazines, student handbook, campus guides, and so on.

Recruit your Chamber of Commerce.

Send welcoming letters to physicians new to the community.

Enlist the assistance of your university's marketing program.

Low Funds/Medium People Power

Plan campus tours for high school and college students.

Write articles for affiliated undergraduate campus newspapers.

Write health and medicine Q and A columns for local daily and suburban newspapers.

Appoint to board and advisory groups community physicians who are not on faculty.

Work with alumni association to make local physicians honorary alumni.

Start sending promotional materials to prospective students from date of first inquiry rather than from date of application.

Send applicants free subscriptions to student newspapers and other periodicals.

Review your application and admissions procedures and remove obstacles and barriers.

Keep internal institutional audiences informed and educated as to your strengths.

Low Funds/High People Power

Involve alumni to serve as recruiters in their communities; as speakers at high schools and colleges; as personal contacts to prospective applicants and applicants.

Involve alumni in your community in medical school events.

Ask alumni in your community and local physicians to host visiting applicants.

Arrange for interested college students to spend time attending classes, rounds, special lectures. Do the same for applicants.

Target the speakers you send to high schools and colleges by race, sex, and interest (computers, sports medicine, administration, and so on)--that is, send the appropriate role models.

Invite applicants to local alumni association meetings.

Involve the county medical society in medical school activities; subsequently, in recruiting.

Ask local physicians to sign op-ed pieces in support of your programs and activities.

Match visiting applicants with your medical students, residents, or faculty for the duration of their visit.

Medium Funds/Low People Power

Prepare and distribute taped radio public service announcements.

Produce two-color brochures.

Prepare a special newspaper (one issue) for applicants.

Create more people power by developing a School of Medicine Associates Program for local physicians and hosting an annual program and tour.

Develop ads for undergraduate newspapers in your region.

Medium Funds/Medium People Power

Use local alumni and school of medicine associates to mentor applicants.

Recruit focus groups of areahigh school and college students to train your speakers.

Send thank-you notes to every premed adviser who sends you an applicant.

Develop recruiting posters for undergraduate campuses in your area--announce on-campus visits, open houses, tours, special programs.

Develop a package of written materials.

Prepare and distribute quarerly newsletters for applicants and inquirers.

Place paid ads in affiliatd and regional campus newspapers.

Medium Funds/High People Power

Host regional gatherings with alumni, faculty, and deans to keep alumni abreast of your unique drawing power.

Place qualified undergraduate students from affiliated campuses in jobs in labs, computer centers, and so on.

Place qualified high school students in jobs in animal care facilities, labs, and so on.

Host on-campus programs for high school students; match them with medical students and residents.

Host career awareness days for high school students to demonstrate the diversity of medicine.

Periodically bring regional premed advisers to campus for two-day tours, seminars, updates.

Place paid Q and A columns in local suburban and campus newspapers.

Conduct speaker's training sessions "ambassador's courses" during alumni weekends.

Develop recognition programs for all institutional staff who help make your recruiting programs work.

High Funds/Low People Power

Purchase generic videotapes, brochures, and so on.

Contract for writers and designers to prepare print materials.

Work with a special events planner to host a reception for local alumni and new local physicians.

Hire a PR firm with experience in the fields of medicine and education to help you develop materials.

Contract for services from other departments in the medical school and university (publications, computer services, and so on).

High Funds/Medium People Power

Develop financial aid packages.

Prepare special tours and support services for families of applicants and students.

Prepare separate mailings for parents of applicants.

Use market research to target audiences and prepare segmented promotional materials.

Contract for a videotape to be used by speakers, premed advisers; send it to student inquirers.

High Funds/High People Power

Develop on-campus summer programs for qualified high school students.

Develop on-campus intersession programs for undergraduate students.

Pay expenses for applicants' on-campus visits.

Develop special lecture series for local business executives.

Honor local physicians for exceptional support of the medical school.

Develop scholarship packages.

Prepare special programs for local high school science and health science clubs.

Create, videotape, and distribute to regional cable outlets, weekly health and medicine programs.

Bring regional high school science advisers to campus for tours, lectures, and special training programs.

Regardless of Funds and People Power

Burnish your image within your own institution.

Burnish your image within your local medical community.

Burnish your image within your local business community.

Make premed advisers feel appreciated and keep them up-to-date on your strengths.

Make applicants and their families feel welcome and wanted.

Keep the information-gathering and application process as simple as possible.

Remember that an effective recruiting program involves many departments.

APPENDIX

List of Participants in the Conference on the Declining Applicant Pool: Implications for the Selection of Medical Students, June 1988. 105

Participants in the Conference on the Declining Applicant Pool:
Implications for the Selection of Medical Students
June 1988

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